

CA-SIR-5

Ref: Responses to CA-IR-22, part b.

HECO's response indicates, "While the Kamoku-Pukele 138 kV Transmission Line Project (via Waahila Ridge) experienced major public opposition, there were no other compelling reasons or indications that the Board of Land and Natural Resources (BLNR) would deny the Conservation District Use Permit for Waahila Ridge." HECO continues on to reference other projects, which had potentially more significant impact on the environment (assumed in HECO's opinion), yet were issued a CDUP. Relative to these HECO statements, please answer the following questions:

- a. Several correspondences from the BLNR, including the August 6, 1998 comments to the Draft EIS (DEIS) state opposition to the project, and indicate that HECO should first consider other existing power line routes before pursuing the Waahila Ridge route. In addition, other correspondences indicate that the existing 46 kV line required significant clearing which was a concern regarding installing the new line. Why does HECO not consider these communications as compelling reasons or indications as to why the BLNR might deny the CDUP?
- b. For the projects referenced such as the Waialua-Kuilima 46 kV Subtransmission Line project and the wind farm on Maui, did the BLNR express similar objections to these projects before issuing a CDUP? Provide copies of any supporting documentation available.

HECO Response:

- a. As a point of clarification, the August 6, 1998 letter referenced was from the Department of Land and Natural Resources (DLNR) and not the BLNR or Board of the Land and Natural Resources. This distinction is important because the BLNR (comprised of six appointed members at the time), not the DLNR, had the authority to grant or deny a Conservation District Use Permit for the Kamoku-Pukele 138 kV Transmission Line Project via Waahila Ridge (Kamoku-Pukele project). A vote of the BLNR members was required before the BLNR could take action on any proposal (H.R.S. Section 171-5). In addition, if the BLNR took no action on HECO's application within the prescribed time limit of the CDUP application process, HECO would be able to proceed with the proposed project (H.R.S. Section 183C-6).

Despite the BLNR's authority in this CDUP, the concerns of the DLNR, as well as the concerns of others, were given serious consideration. Through various studies and professional opinions, HECO believed that the concerns expressed could be adequately addressed. Thus, the concerns expressed were not compelling enough reasons at the time to abandon the project and pursue another alternative. (Past experience would not have elevated the referenced comments to the status of "fatal flaws". Conservation districts had previously been used for vital electric infrastructure projects. HECO already had an easement for the 46kV line on Waahila Ridge, and HECO proposed to use the same route. The ground rules for pursuing EIS comments were, in effect, reinterpreted during the course of the EIS for this project, significantly increasing the cost of responding to the unprecedented level of "comment bombing".)

Please find attached HECO's responses to the DLNR's August 6, 1998 and December 7, 1999 letters on the project. (See CH2M Hill's letters to DLNR dated December 7, 1998 and June 15, 2000, attached as pages 4-11 and 12-29, respectively.) Also attached are examples of HECO's responses to others who expressed concerns with clearing around the existing 46kV lines and proposed 138kV line on Waahila Ridge. (See CH2M Hill's letters to State Representative Calvin Say; Randall Fujiki, City Department of Planning and Permitting; Sara Banaszak; and Donna Wong, Hawaii's Thousand Friends, attached as pages 30-31, 32-39, 40-41, and 42-58, respectively.) The attached responses were copied from Volume 4, Appendix N and Volume 11, Appendix P of the Kamoku-Pukele 138kV Transmission Line Project Revised Final Environment Impact Statement.

- b. The DLNR did express concerns with the Waialua-Kuilima 46kV Subtransmission Line and the Zond Pacific windfarm projects. For the Waialua-Kuilima 46kV Subtransmission Line

project, in a May 30, 1996 memo, the Land Division of the DLNR said "The Oahu District Office of Land Management still prefers that the applicant utilize the alternate A1 coastal underground alignment . . ." (See attached page 59.) While the DLNR ultimately recommended that the BLNR grant the CDUP for the project, the DLNR noted the following in their August 23, 1996 report:

"In terms of the direct environmental impacts associated with the proposed overhead mid-level mauka alignment, substantial clearing of vegetation including some native vegetation would be required. This would lead to an increase in erosion and sedimentation. In addition, the use of herbicides to retard plant growth along the alignment would increase the amount of chemical residues in the ecosystem. There are also visual concerns that have been raised by agencies and individuals. Although visual impacts are difficult if not impossible to quantify in monetary values, the effects of these lines on the human mind are surely negative."

See attached pages 60-98.

For the proposed Zond Pacific windfarm project at Kaheawa Pastures on Maui, in an August 12, 1998 memo, the DLNR expressed concerns in regards potential impacts to endangered species that were believed to be in the project area. (See attached pages 99-113.)

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Thank you for your cooperation in this matter. Please feel free to contact Sam Lemmo of the Land Division at 587-0381 should you have any comments on this matter.

Alona,

Michael D. Wilson
Michael D. Wilson

CH2MHILL

December 7, 1998

cc: Kerston Wong (HECO)
boll/bot/bph/OHA/UR/Facilities Management and Planning
Office)/OEQC/DBEDT
City and County of Honolulu Dept.

bcc: All Divisions

Mr. Michael Wilson
Director
Dept. of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

Subject: Hawaiian Electric Company, Kamoku-Pukele 138-kV Transmission Line Project Draft
Environmental Impact Statement Comments

Dear Mr. Wilson:

Thank you for your letter concerning the Kamoku-Pukele 138-kV Transmission Line Project Draft Environmental Impact Statement (EIS). Our responses to your individual comments follow:

1. *It appears that the primary reason for the new 138-kV line between the Pukele and Kamoku substations is to increase system redundancy to avoid future system overloading and potential power outages. Of a secondary nature appears to be the projected increase in demand for electricity in the service area.*

Your description is partially correct. A key reason to construct the proposed line is to avoid a blackout of the Pukele service area (that is, 18 percent of Oahu's electrical load), primarily in the urban Honolulu areas of Waikiki, Kahala, Kapahulu, Kaimuki, McCully, Molliehill, St. Louis Heights, Manoa, and Palolo) by increasing redundancy in HECO's transmission system. Presently, a blackout of the Pukele service area can result from a loss of the two existing transmission lines between the Koolau Substation and the Pukele Substation. The proposed line from the Kamoku Substation would provide a third transmission line to Pukele. In addition to this reason, the redundancy provided by the proposed line would increase system reliability by closing the existing gap between the Northern and Southern Transmission Corridors. Closing the gap would allow power to flow from the southern corridor through the Pukele Substation to the Koolau Substation should the lines feeding the Koolau Substation fail. Conversely, the proposed line will allow power to flow from the northern corridor through the Kamoku Substation to the Iwilei, School Street, and Archer Substations should lines feeding those downtown substations fail. In doing so, the Kamoku-Pukele Line would prevent overloading of the three transmission lines feeding the Koolau Substation and the three transmission lines feeding the Iwilei and School Street Substations, and the resultant loss of power to those substations. The proposed line would also provide for load growth in the Ali Moana, Kakaako, and Waikiki areas.

With respect to the need for the proposed action, HECO has a regulatory and contractual obligation to provide reliable electric service at the lowest reasonable cost. In fulfilling that obligation, HECO believes that the Kamoku-Pukele Line is needed and

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that the need has been justified. In the past, the BLNR has deferred to the Public Utilities Commission (PUC) to determine the need for transmission facilities proposed by HEICO. With respect to the Kamoku-Pukele Line, the need has been recognized by the PUC, who recognized the reliability benefits of the line in Decision & Order No. 12627, Docket No. 7602 by stating "[t]he new circuit will also provide a third feed to the Pukele substation, the most heavily loaded 138kV substation in the HEICO system. This will improve system reliability and ultimately benefit ratepayers."¹

It should be noted that the PUC has been granted under State law the sole jurisdiction to regulate public utilities.² Specifically, the PUC derives its authority over public utilities from H.R.S. § 269-6, which states:

The public utilities commission shall have the general supervision hereinafter set forth over all public utilities, and shall perform the duties and exercise the power imposed or conferred upon it by this chapter.

Included in these broad powers is the PUC's authority to examine and to investigate and enforce HEICO's compliance with the provisions of the Hawaii public utilities law (H.R.S. Chapter 269), the PUC's rules, orders, and requirements, and HEICO's franchise (H.R.S. § 269-7 & 269-15). In performing its duties, the PUC must determine whether a facility or property that the public utility is seeking to include in the utility's rates is a public necessity. Descriptions of the PUC's authority to determine the necessity of a utility's facility can be found in the Hawaii Revised Statutes, within HEICO's own franchise, and the PUC's rules.

For example, the PUC is given explicit authority: (1) "to examine the manner in which [each public utility] is operated with respect to the safety or accommodation of the public" (H.R.S. § 269-7), (2) to determine whether "changes, extensions, or repairs are desirable in [a public utility's] plant or service to meet the reasonable convenience or necessity of the public, or to ensure greater safety or security" (H.R.S. § 269-15), and (3) to "regulate the manner in which the property of every public utility is operated with respect to the safety and accommodation of the public" (H.R.S. § 269-16(b)). In investigating the reasonableness of a utility's rates and to approve increases in rates, the PUC is allowed to provide a fair return on a utility's property that is "actually used or useful for public utility purposes" (H.R.S. § 269-16(b)).

In addition, pursuant to its franchise,³ HEICO is granted the right to furnish electric power on the Island of Oahu and to install poles, wires, conduits, and other facilities in public rights-of-way for the transmission, distribution, and supply of electricity. In return, a franchise fee is paid to the county and HEICO is under an obligation to extend service "whenever it shall be made to appear that said extension is a public necessity and that said extension or extensions can be made to earn a reasonable profit on the cost and maintenance of the same."⁴

Finally, pursuant to Hawaii state law, the PUC has promulgated rules for reviewing the need for electric utility plant projects costing in excess of \$500,000.⁴ The PUC has examined the need for transmission line facilities in numerous proceedings, and has considered and determined the appropriateness of constructing such lines overhead or underground. See, for example, Re Hawaiian Electric Co., Docket No. 7526, Decision & Order No. 13201 (April 7, 1994, reported at 151 P.U.R. 4th 30 [Haw. PUC 1994], aff'd 81 Haw. 459, 918 P.2d 561 [1996]).

The PUC's exclusive jurisdiction over the issues regarding the need for and rate impact of public utility facilities is compelling based on an examination of Chapter 269, Hawaii Revised Statutes. In addition, the PUC's exclusive authority over public utilities has been confirmed by the Hawaii Supreme Court, which held that the Legislature intended to restrict such powers over public utilities for the PUC and had preempted the power of the counties to regulate the height of poles under its zoning authority.⁵

Thus, the fact that the PUC, which has sole jurisdiction over public utilities and the need for facilities, has recognized the reliability benefits of HEICO's project as a compelling reason to construct the Kamoku-Pukele Line. It should also be noted that the Consumer Advocate, the U.S. Department of Energy, the State Office of Emergency Management, and the State Department of Business, Economic Development & Tourism have also supported and recognized the need for the Kamoku-Pukele Line as follows:

1. The Consumer Advocate, who recognized the reliability benefits of the line within their Amended Statement of Position to Docket No. 7602: "The new 138-kV circuit will also provide a third feed to the Pukele Substation which is the most heavily loaded 138-kV substation on the HEICO system (19 percent of the total system load) via a second and diverse route. This second route will increase system reliability which will ultimately benefit ratepayers."
2. The U.S. Department of Energy and the State Office of Emergency Management, who recognized the need for the line through their Post-Hurricane Iniki Hawaiian Islands Hazard Mitigation Report, in which they made recommendations to "close the radial transmission loops on Oahu." The Kamoku-Pukele line would achieve this recommendation.
3. The State Department of Business, Economic Development & Tourism, who cited the *Hawaiian Islands Hazard Mitigation Report* recommendation in its Draft Environmental Impact Statement (Draft EIS) response letter.
2. *If the Kamoku Substation is developed with a 138-kV link from Kewalo, can power be routed through Kamoku to service areas currently serviced by Pukele?*

Yes, but at considerable cost and without addressing the other needs that the Kamoku-Pukele line would address. A line linking the Kewalo and Kamoku Substations has already been approved by the State of Hawaii Public Utilities Commission and is under construction. However, by itself, this line will not meet the need to provide reliability to

¹ Citizens Utilities Co. v. County of Kauai, 72 Haw. 285, 286, 814 P.2d 98, 100 (1991) citing H.R.S. § 269-6.

² HEICO's franchise is found, in its entirety, in the Revised Laws of Hawaii of 1935 (Volume 11, Appendix). It has been amended by the following legislative Act: Act 134, 1961 Sess. L. Haw. 176, as amended with respect to 4 By Act 86, 1974 Sess. L. Haw. 153.

³ HEICO Franchise # 2, 10, 16.

⁴ Paragraph 2.3 g.2, General Order No. 7 ("Standards for Electric Utility Service in the State of Hawaii"), adopted by Order No. 1635, issued September 20, 1985 in PUC Docket No. 1637.

⁵ Citizen Utilities Co., 722 Haw. at 288, 814 P.2d 398.

the Pukele Substation because it would not close the gap between the northern and southern corridors. Without closing this gap, power cannot be transferred to the Koolau, Pukele, and Downtown Substations through an alternate route when required. It should be noted that although the Kamoku Substation is planned to service new load in the Waikiki and surrounding urban Honolulu areas, the Kamoku Substation could not serve the existing area currently served by the Pukele Substation without the construction of more 46-kV lines emanating from the Kamoku Substation. Moreover, a 138-kV link between the Koolau Substation and the Kamoku Substation would still be needed to provide the necessary alternate power route through the northern corridor in order to maintain the reliability of the Kamoku Substation. Power cannot be routed from the northern corridor to serve HECCO's southern corridor substations at Kamoku, Kewalo, Archer, Iwilei, and School Street without first providing a way for the power to reach the Kamoku Substation from a substation connected to the northern corridor, such as Pukele.

3. *The EIS refers to the future loads requirement of the Convention Center, Ala Moana Center, the proposed Keeaumoku Center, Pawaii Block, and Victoria Ward developments. When Kamoku is fully developed, will it be possible to provide reliable service to these areas without relying on a new 138-kV line from Pukele to Kamoku by upgrading the Archer/Kewalo/Kamoku system?*

Yes, your suggestion is possible. An upgrade of the Kamoku Substation and its distribution system would solve just one objective: supplying the load growth in the McCallum/Molii/Waikiki areas that would be served by the Kamoku Substation. But there are other problems to be solved. Developing Kamoku would not solve the fundamental need to close the gap between the northern and southern corridors (which exists between the Kamoku and Pukele Substations) to provide greater transmission system reliability to East Oahu and Windward Oahu. Another northern corridor line would eventually be necessary to feed Koolau in order to prevent the overloading the existing lines feeding that substation. Developing Kamoku would also advance the future overloading situation on the three southern corridor lines feeding Iwilei and School Street, thereby requiring another southern corridor line to back up the three feeds. The Kamoku-Pukele line would meet all three objectives and problems described above with one transmission line.

HECO did evaluate an alternative that would provide feeds to Kamoku Substation from Archer (via Kewalo Substation) and School Street Substation. However, this alternative assumes that Pukele Substation would still provide service and would, therefore, still require a third line to improve its reliability. In addition, this alternative does not address the need to close the gap between the northern and southern corridors to ensure that power can travel in a clockwise direction (along the northern corridor) to feed substations, or in a counter-clockwise direction (along the southern corridor) to maintain service to the 138-kV/46-kV substations that serve East Oahu and Windward Oahu. Finally, if this alternative assumes that the Kamoku Substation would replace the Pukele Substation, a series of new 46-kV lines would need to be sited and constructed in local neighborhoods to serve those substations that are now fed by the Pukele Substation. This new construction would have environmental impacts on the surrounding neighborhoods, such as construction noise, traffic disruption, and the

addition of overhead lines. The overall cost to develop Kamoku Substation as suggested would far exceed the cost for the proposed action and is not considered a reasonable alternative.

These alternatives are discussed in Section 3.5 of the Draft EIS and in Appendix C.

4. *It is stand that Waikiki will be affected if Pukele fails, but if service can be improved in the Archer/Kewalo/Kamoku system, as stated in the EIS, then risk of overloading in the Waikiki and Ala Moana areas serviced by Pukele can be reduced.*

As indicated in our response to your Comment #3, even though Waikiki load growth can be met through a substation on the Southern Transmission Corridor such as Kewalo or Kamoku, constructing distribution lines to meet this load growth would not close the existing gap in the transmission system between the Northern and Southern Transmission Corridors, which is required to maintain the reliability of any substation serving Waikiki. Without constructing the Kamoku-Pukele transmission line as proposed, the loss of the two lines from the Koolau Substation to the Pukele Substation would result in the blackout of urban Honolulu and Waikiki, areas whose loads are served by Pukele Substation. Overloading of circuits would not be a factor in such an incident.

5. *Is it possible to install two 138-kV lines to Kamoku from Archer and upgrade the distribution system to provide for increased redundancy and more power?*

Yes, however, this would provide reliability for only the limited area served by the upgraded Kamoku Substation as compared with the wide area for which the proposed Kamoku-Pukele line would provide reliability. Your suggestion does not address the fundamental need to close the gap between the northern and southern corridors, which would improve reliability to Windward Oahu as well as East Oahu, approximately 54 percent of Oahu's customers.

6. *What are the real consequences of not building the new link between Pukele and Kamoku in terms of system reliability if the Archer/Kewalo/Kamoku grid is upgraded?*

The real consequences would be that Windward Oahu and downtown customers would not benefit from the increased reliability that the Kamoku-Pukele line would provide, as described in Section 2 of the Draft EIS. This is the result of the potential overloading problems faced by the Koolau Substation, which would be addressed by the proposed action and would not be addressed by upgrading substations downtown. Loss of the Koolau Substation would affect power from Kahuku to Hawaii Kai. Another real consequence would be that the overloading condition in the southern corridor would be accelerated because the northern corridor would not be connected and would, therefore, not relieve that overloading condition. With more power flowing through the Downtown Substations to feed Waikiki, the forecasted overloading would occur sooner. Without the ability to receive power through the alternative northern corridor, loss of the Downtown Substations due to overloading would still leave Waikiki without power. The suggested upgrading of those three substations would not address the need for a third feed to the Pukele Substation and the need to alleviate future overloading problems on the three lines feeding the Koolau Substation.

7. Based on "actual" loads identified in figure 2-6, it appears that the projected increases are somewhat inflated as actual load growth for Oahu appears to be leveling-off rather than steadily climbing as indicated on the graph. Moreover, most of the future load growth for the Oahu system would appear to be in the West Oahu sector where most of Oahu's urban East Oahu area, as it appears that this area is nearing build-out (except for some downtown areas where redevelopment is stated to occur). The view that redundancy must be improved to reduce the risk of future outages due to load growth in this sector, raises questions if projected demand in the East Oahu sector is slower than projected.

The projected demand increases are not inflated. The load growth in East Oahu is anticipated to increase one percent per year and is not "leveling off." While the line would also improve reliability by providing another backup line to prevent future overloading for HECo's Koolau and downtown substations, the Pukele Substation currently remains at risk in being served by only two transmission lines. The third line is needed now to prevent major blackouts in the service area, regardless of projected load growth.

Assuming that growth in demand for electricity has a direct relationship to growth in population is a common error. The population levels within the census areas making up the five neighborhood boards within the study area have remained relatively steady or even decreased over the last 5 years. However, electricity demand, as recorded on the distribution substations within these same areas, has actually increased steadily over the last 5 years. Growth in energy demand comes from many sources other than more people or more homes. In mature development areas, demand depends upon the types of electrical uses and the number of appliances and equipment used within existing homes, including air conditioners, computers, televisions, etc.—all of which continue to steadily increase.

The load growth in the East Oahu Service Area is predicted to grow at approximately 1 percent per year regardless of whether the Honolulu population is migrating westward. Even with slower growth, the demand on existing substations will continue to increase because of planned and approved projects in the service area. As system loads increase to the level where the load could cause a transmission line to exceed its rated capacity, unsafe and unreliable conditions will develop, resulting in power outages and permanent damage to the electrical system. Connection of the Northern and Southern Transmission Corridors via the Kamoku-Pukele route is needed to address the existing service reliability concerns at the Pukele Substation. It is also necessary to prevent overloading of existing circuits to the Koolau, Iwilei, and School Street Substations, and to provide additional capacity to meet the projected load growth within East Oahu.

With respect to the uncertainties of load growth, the guidelines of the North American Electric Reliability Council (NERC), an international organization focused on coordinating power system reliability in North America, state, "transmission capacity must be available on the interconnected transmission systems to provide flexibility to handle the shift in facility loadings caused by the maintenance of generation and transmission equipment, the forced outages of such equipment, and a wide range of other system variable conditions, such as construction delays, higher than expected customer demands, and generating unit fuel shortages." It must be noted that these guidelines address mainland interconnected systems. Because Hawaii's system is

Independent—not Interconnected—it can be argued that Hawaii standards should be more conservative and provide more redundancy than NERC standards. Accordingly, as it relates to the Kamoku-Pukele project, it would be neither wise nor prudent to allow the timing of this, a long-term infrastructure project, particularly as it is related to legal and regulatory obligations, to be influenced by changes in short-term load growth.

8. These sections (Section 2 and pages 3-65-64) should be re drafted to fully clarify, in lay terms, the ramifications of providing electrical service to the study area with and without the new 133-kV line.

As discussed in Section 2 of the Draft EIS, there is a definite need for the project in order to prevent blackouts in the Pukele Service Area, including urban Honolulu and Waikiki. Should one of the transmission lines to Pukele Substation be down for maintenance and the remaining transmission line fail, the entire substation would drop off of the system, resulting in a loss of electricity to 18 percent of the customer load on Oahu. This scenario would include a complete blackout of Waikiki. As an example, the January 1987 (Super Bowl Sunday) outage to urban Honolulu and Waikiki would have been prevented had the proposed transmission line been in place.

The ramifications of the no-action alternative are fully explained in Sections 2 and 3 of the Draft EIS. The most severe ramification would be the potential for the complete and total blackout of the Waikiki tourist destination area as described above.

We have reviewed Section 2 of the Draft EIS and have made changes incorporating additional material concerning the project need in the Final EIS. Because this project is a complex engineering proposal, it is not always possible to completely reduce the necessary discussion of these complex technical concepts to laymen's terms.

9. It is suggested that projected demand increases be revised to determine actual demand growth for the East Oahu area. Projected demand growth for the East Oahu area may be substantially less than growth for other areas of Oahu.

Projections for demand increases are revised regularly. However, as noted previously, the line is needed even if the load does not increase as forecasted because the primary purpose of the project is to close the gap between the Northern and Southern Transmission Corridors in order to address the existing service reliability concerns at the Pukele Substation. It is also necessary to prevent overloading of existing circuits to the Koolau, Iwilei, and School Street Substations, and to provide additional capacity to meet the projected load growth within East Oahu. The load in the East Oahu Service Area is predicted to grow at approximately 1 percent per year regardless of whether the Honolulu population is migrating westward. Even with slower growth, the demand on existing substations will continue to increase because of planned and approved projects in the service area. As system loads increase to the level where the load could cause a transmission line to exceed its rated capacity, unsafe and unreliable conditions will develop, resulting in power outages and permanent damage to the electrical system. Connection of the Northern and Southern Transmission Corridors via the Kamoku-Pukele route is needed to address the existing service reliability concerns at the Pukele Substation. It is also necessary to prevent overloading of existing circuits to the Koolau, Iwilei, and School Street Substations, and to provide additional capacity to meet the projected load growth within East Oahu.

With respect to the uncertainties of load growth, the guidelines of the North American Electric Reliability Council (NERC), an international organization focused on coordinating power system reliability in North America, state, "transmission capacity must be available on the interconnected transmission systems to provide flexibility to handle the shift in facility loadings caused by the maintenance of generation and transmission equipment, the forced outages of such equipment, and a wide range of other system variable conditions, such as construction delays, higher than expected customer demands, and generating unit fuel shortages." It must be noted that these guidelines address mainland interconnected systems. Because Hawaii's system is

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10. HECCO has considered conservation and alternative generation facilities like solar to reduce the need for new transmission facilities to help meet their goals of achieving reliability in the future demand and are there actual figures and targets that can be given?
- The load forecasts, shown in Section 2 of the Draft EIS, incorporate the impacts of conservation measures in slowing load growth.
11. Please provide a section discussing the potential rate increase differentials for the average household and business for one or several of the project alternatives.
- The information you requested was included in Table 4-11 of the Draft EIS (which is renumbered as Table 4-12 in the Final EIS, which will be provided to your office).
- It is our opinion that the system may have a significant effect on view planes from several different vantage points.
- We acknowledge your opinion regarding the potential significant effect on view planes from several different vantage points. Even though there are 20 poles planned, due to the location of the poles or intervening topography, no viewing areas have been identified where more than 8 poles may be viewed at one time.
- In reviewing the level of visual impacts associated with the proposed action along Waialae Ridge, we were guided by the criteria contained in Section 11-200-12, Hawaii Administrative Rules (HAR), which state that, "In most instances, an action shall be determined to have a significant effect on the environment if it "12) Substantially affects scenic views and view planes identified in County or State plans or studies." We have not been able to identify any county or state plans or studies that designate Waialae Ridge as a scenic vista or view plane that could be "substantially affected" as defined by the criteria.
- While the proposed action would alter the existing visual condition, we do not believe the visual impacts of the proposed action should be considered significant. Many individuals, including yourself, have expressed the opinion that the potential visual impact of the proposed action could indeed "involve a substantial degradation of the environmental quality," as stated under 11-200-12(7), HAR, and thus could result in a significant adverse visual impact. Given the subjective nature of any visual resource assessment and the rather vague and ambiguous significance criteria outlined in 11-200-12(7), HAR, we cannot argue with the validity of anyone's opinion regarding the visual significance and related impacts of visual resources. While some people may not perceive it as a significant adverse visual impact, we must recognize the importance of the many comments received reflecting an opinion that the proposed action would result in a significant adverse impact.
- The Final EIS includes additional mitigation measures that may minimize the visual impact of the project. These may include painting the poles to blend in with the background landscape, planting of strategic landscape vegetation to provide a more diverse landscape and reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridge line.
- HECO realizes, however, that there will still be those individuals who would feel that no amount of mitigation would be able to lower the level of adverse impacts to a point.

- below her/his personal "significance" threshold, and whose only solution would be to not build an overhead line within the existing easements along Waialae Ridge. The only method for completely eliminating the visual impacts of the proposed action along Waialae Ridge would be to build the line underground through Paolo Valley or elsewhere. However, the PUC stated in its Decision and Order 13201 relating to the Waialae-CIP, Part 2 Transmission Lines that, "Whether of these factors (esthetics and EMF), however, would justify the underground placement of the transmission lines since esthetics and as yet inconclusive health effects of EMF do not constitute compelling reasons that would outweigh the added cost of placing the lines underground."
- In addition, through Act 133, adopted in 1994, the state legislature further recognized the need for the PUC to balance the exceptionally high cost of constructing electric utility lines underground with other relevant factors when the PUC exercises its exclusive authority to determine whether it is preferable to construct the electric utility lines overhead or underground. In adopting Act 133, which amended Chapter 269, HRS, the legislature stated:
- While there are benefits to constructing electric utility lines underground, those benefits extend not only to the utilities' ratepayers, whose rates should reflect the utilities' cost of providing reasonably reliable electric service, but extend to the public at large. Ratepayers should not be forced to pay through their rates, for these additional costs. Accordingly, in the interest of fairness and equity to all ratepayers served by public utilities within the State, those policy making or implementing bodies that require that electric utility lines be placed underground should provide the funds in excess of those required for overhead construction.
- Agencies wishing to implement policies requiring undergrounding of electric lines should bear in mind portions of Chapter 269-27.5A (2), which indicate that when the PUC makes its decision on whether lines should be placed overhead or underground, it shall consider, "whether there is a governmental public policy requiring the electric transmission system to be placed, constructed, erected, or built underground and the governmental agency establishing the policy commits funds for the additional costs of undergrounding."
- Section 5.4 conveys the impression that the new system would not create any detrimental impacts to conservation values and presumes that the new system conforms with Conservation District subzone criteria, even though it would result in a much greater intrusion upon conservation values than presently exists. HECCO may wish to reconsider this position since it is rare that we encounter 138-kV transmission lines on prominent ridge lines near populated areas of the state.
- We have reviewed the proposed action and its relationship with the Conservation District criteria for the applicable subzones. We continue to believe that the replacement of the existing subtransmission line with the proposed action conforms to the criteria in relation to public purpose uses and does not represent a much greater intrusion on the Conservation District values.
- The proposed action is a "public purpose use" as defined under HIAR 13-5-22. As indicated in your letter of August 6, 1998, public purpose uses are identified uses within

all Conservation District Subzones. The criteria the Board of Land and Natural Resources shall use for evaluating the merits of any project are well established in HAR 135-30. Briefly, those eight criteria are as follows:

1. The proposed land use is consistent with the purpose of the Conservation District.
2. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.
3. The proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS, entitled "Coastal Zone Management," where applicable.
4. The proposed land use will not cause substantial adverse impact to existing natural resources within the surrounding area, community or region.
5. The proposed land use, including buildings, structures and facilities, shall be compatible with the health and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcel or parcels.
6. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whichever is applicable.
7. Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.
8. The proposed land use will not be materially detrimental to the public health, safety and welfare.

As we indicated in Section 5.4 of the Draft EIS, as a public purpose use, the proposed project is consistent with the objectives of all subzones it would pass through. Such public purpose uses are recognized as required to fulfill government mandates to protect the public health, safety, and welfare of public utility requirements. Because the proposed action calls for the replacement of the existing 46-kV subtransmission poles with the same number of new steel poles in their same general locations, disturbance to existing geological and biological resources would be minimal and recoverable, consistent with the objectives of the Limited Subzone. The proposed action would not impact any of the resource subzone's objectives, such as capability for growing or harvesting timber or existing recreational endeavors, because the project would not take away existing land used for park or hiking. The project also would not create any long-term barrier within known hiking trails that would prevent their use nor would it take away from existing open space.

With the use of an already existing utility corridor along Waahila Ridge, the replacement of the existing poles with new steel poles does not represent new structures or facilities. Nor do the proposed poles represent the introduction of new visual elements into the landscape.

It should be noted that the Conservation District covers only a small portion of the project area along Waahila Ridge (7 of 20 poles) and that the new poles within the Conservation District would be, with the exception of the H-structure, shorter than the background trees. The most prominent portions of Waahila Ridge are those outside of the Conservation District. HEKO has proposed additional mitigation measures for the

project located both in the Conservation and Urban Districts that may minimize the visual impact of the project. These may include painting the poles to blend in with the background landscape, planting strategic landscape vegetation to provide a more diverse landscape and reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridge line.

14. In general, DOFW opposes any changes beyond what currently exists for Waahila Ridge. Since 1970, we have maintained that power line easements through State Forest Reserves compromises the existing natural resource values from watershed to recreational uses. There are existing power line routes along urban intermixed areas that HEKO should consider first for their electrical distribution improvements.
Your comments are noted. As discussed in Section 3.3.3 and Appendix B of the Draft EIS, HEKO considered and weighed a variety of environmental, economic, and technical factors before selecting the proposed action, which balances the issues and results and offers a technically sound alternative at a reasonable cost. An alternative route that would not cross the Conservation District was considered, but not selected as the proposed action due to its high cost. Note that HEKO's regulatory obligation is to present to the PUC an alternative that represents the lowest reasonable cost.
HEKO's Integrated Vegetation Management (IVM) program has been accepted by the Department of Land and Natural Resources as an appropriate method for controlling vegetation within the rights-of-way, controlling invasive species and encouraging native species, and for controlling erosion.
15. We know that the native bird populations will be affected by the permanent modification of their habitat and the resulting maintenance of the utility corridor through the Forest Reserve. More information should be provided on these proposed changes and the impact to flora/fauna.
A discussion of the potential impacts on flora and fauna is presented in Sections 4.9 and 4.10 of the Draft EIS, respectively. As indicated on pages 4.43 and 4.44 of the Draft EIS, no impacts on birds or wildlife from the proposed action are expected. Additional surveys for both flora and fauna were conducted in August 1998 to respond to comments on the Draft EIS. Those surveys are summarized in Sections 4.9 and 4.10 of the Final EIS and the 1998 reports are contained in Section 10 of the Final EIS.
16. In locations where underground placement of power lines is unavoidable and where new poles (would) replace existing poles, every effort should be made to use "Best Management Practices" to minimize the effects of erosion to the Ala Wai watershed area.
We agree. HEKO would employ all means necessary to prevent sediment from entering the watershed from construction-related activities. These best management practices could include the use of portable dikes or sandbags upslope of the disturbed area around each pole to deflect runoff away from bare soil areas. Silt fences would be placed downslope from each disturbed area to retain any sediment that does run off disturbed areas.
During construction of the underground portion of the proposed action within the Urban District, the high water table would require dewatering activities. During dewatering activities, water can be removed from the construction area and either stored in a holding tank and or taken away for disposal on an open field site, or the

Mr. Michael Wilson
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dewatering effluent can be pumped into an adjacent trench to allow for natural infiltration back into the water table. Both of these measures would avoid placement of the dewatering effluent into storm drains, which could lead to nearby streams or to the Ala Wai Canal.

17. A mitigation plan to prevent wildfire during construction is recommended. This should be explained further in Section 4.18 of the DEIS under Public Safety and Service, because the meadow portion of the proposed power line corridor meanders through old growth dry native-introduced vegetation that abuts residential neighborhoods and recreation areas. Fire prevention activities that currently are performed by HECO as part of its IVM program would continue. These activities include the trimming and/or removal of vegetation that could contact or fall into the overhead transmission lines and the appropriate disposal of slash and logs. The Honolulu Fire Department reviewed the proposed action and issued no objections.

18. The transportation section of the EA identifies some of the transportation needs for project construction, but did not indicate how these needs were to be met.

We are unclear about what transportation needs you are referring to. Section 4.19 of the Draft EIS contains a lengthy discussion on the potential impacts on the surrounding transportation system of the construction of the project. Operations and maintenance of a transmission line generally have no identified transportation need nor do they directly generate traffic.

As a requirement for trench work within the existing urban streets, approximately two lanes of traffic would be closed on either side of the excavation area and traffic rerouted around the trench. Given the width of Kapiolani Boulevard between Date Street and the H-1 freeway (significantly wider than the Kapiolani Boulevard segments that experienced recent construction), significant disruptions to traffic would not be anticipated. Construction within any one segment of the underground portion would generally take 2 to 3 months to complete. The only businesses located along the proposed alignment are those between King Street and the Old Waikae Avenue Extension Bridge. All work within city streets must be coordinated with the Department of Transportation Services and hours of construction must not conflict with peak traffic times.

Underground installation of the proposed line within the University of Hawaii would occur along the access road running from Waikae Gate past Rainbow Stadium. During construction, this access road may prove impassable. However, alternative access through the Dole Street and Varsity Gates exists to the lower quarry area and alternate routes through the lower campus to the ROTC and stadium facilities exist. At no time would access to any University facilities be completely blocked. In addition, construction along student housing areas could be timed to occur during vacation periods to minimize disruptions and disturbances.

Construction along Waikiki Ridge could require daily helicopter trips during the construction period. Foundation excavations would be dug by hand. Pole installation usually can be performed within 2 to 3 weeks.

Following construction of the proposed action, maintenance or repair of the underground portion could result in temporary traffic disruptions. All activities would

be coordinated with the Department of Transportation Services. Helicopter flights along the overhead portion of proposed action would generally occur once a year to visually inspect and clean insulators as needed.

19. Please include a discussion of the project construction impacts, if any, on the State Recreation Area access road, the parking and picnic areas, and the dirt roads and hiking trails. Is HEKO proposing to use heavy equipment on park roads and trails to gain access to the construction sites? If a portion of the State Recreation Area is to be used, what construction activities would occur and how long would these activities continue? How will park users be affected? Please provide a detailed discussion with mitigation measures, if this is the case.
- Temporary poles would be constructed within the easement adjacent to the existing H-frame structure and the existing structure would be removed. Foundations would be excavated by hand and pole sections would be flown in and placed by helicopter. The conductors would be placed on the new structure and temporary structures removed. It is anticipated that access through the area of construction may be restricted for safety reasons during the construction period. Because the new structure would occupy less land area than the existing four pole structure, the new structure would actually increase the area available for hikers. Park use may also be restricted during the helicopter operations associated with the installation of Pole 5, located near the lower picnic area of the park. Overall disruptions to park use would be intermittent over a 2- to 3-week period. Adequate notice would be given to the public before work were to be done on Waikiki Ridge.

HECO would coordinate with the Department of Land and Natural Resources to minimize impacts on the park and park users, and to select the best time of year for this installation. After construction of the transmission lines, there would be no impact on the park.

20. We are concerned about the impact (of) the proposed overhead routing on the Honolulu Fire Department's (HFD) ability to control brush fires that occasionally occur on Waikiki Ridge. No impacts were identified in the Draft EIS for the operational phase of the proposed action. During operation of the proposed action, fire prevention activities that currently are performed by HECO as part of its IVM program would continue, and the Honolulu Fire Department would be able to access the area within the right-of-way in the same manner as it currently does.
- The City and County of Honolulu Fire Department, in its June 23, 1998, comment letter, indicated that it had no objections regarding the proposed action.
21. Regardless of the alignment or routing method (overhead/underground) selected, the applicant should take appropriate measures during construction to minimize erosion and silt runoff to the greatest extent possible.

We agree. HECO would employ best engineering practices (BEPs) to prevent sediment from entering the watershed from construction-related activities. These BEPs could include the use of portable dikes or sandbags upslope of the disturbed area around each pole to deflect runoff away from bare soil areas. Silt fences would be placed downslope from each disturbed area to retain any sediment that does run off disturbed areas.

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Thank you for taking the time to review the Draft EIS. Please feel free to contact me if you have further questions or comments regarding this project.

Again, thank you for your comments.

Sincerely,

CH2M HILL


Mark Willey, AICP
Project Manager

cc: Kerstan Wong, HECCO
Gary Gill, OEQC

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Timothy E. Johns
June 15, 2000
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In our earlier comments (attached), we questioned the load growth projections for Oahu. We interpreted the data as depicting a leveling-off pattern, rather than a growth pattern as noted by HECo. Now with the inclusion of the 1998 data on actual usage, electrical use appears to be declining. Please provide the 1999 data in the final document and reassess projected load growth if any.

Figures 2-6, 2-7, 2-8 and 2-9 in the September 1999 RDEIS will be revised in the RFEIS to incorporate the 1999 data as you requested. Please see the enclosure to this letter.

The actual peak recorded in 1999 was 1,161 MW. This, HECo's annual peak demand has decreased for two consecutive years as the result of the island's power economic growth. However, Oahu's economy is expected to recover beginning in 2000. It is also expected that the recent downward trend in the system peak load will reverse itself and begin increasing once again as electrical loads follow the improvement in the economy.

One of the key elements of information used by the forecast process is the economic outlook. As a demonstration of the relationship between energy consumption and economic activity, attached is a graph of HECo's Consolidated Energy Consumption (HECO, MECO and HELCO) versus real Gross State Product (GSP), which is the broadest measure of the output of the economy. Since the Gross State Product covers the entire state, the energy consumption data are consolidated to correspond as closely to the geographical coverage of GSP as possible. (the energy sales exclude Kauai, as its electric utility is not owned by HECo.)

The graph shows that there is a very strong correlation between energy sales and the economy. The statistical measure of goodness-of-fit, R², is over 97 percent, which indicates that nearly all of the variation in HECo's consumption is explained by changes in the GSP. Regardless of growth issues, the new transmission line is needed to improve reliability in the East Oahu Service Area. In particular, the reliability concern facing 18 percent of Oahu customers fed from the Pukela Substation is not dependent on growth in electricity demand. The entire Pukela service area is presently at risk whenever one of its two existing 138-kV transmission lines is removed from service for planned maintenance. If the sole remaining line feeding the Pukela Substation is lost for any reason, the entire Pukela service area is blacked out. This is not a future reliability concern. By proposing this project, HECo is working to prevent the reoccurrence of blackouts such as the January 1987 (Super Bowl Sunday) outage that affected urban Honolulu and Waikiki. This outage would have been prevented had the proposed Kamoku-Pukela 138-kV transmission line been in place.

Subject: Hawaiian Electric Company, Inc.'s Kamoku-Pukela 138-kV Transmission Line Project Revised Draft Environmental Impact Statement (September, 1999)

Dear Mr. Johns:

Thank you for your comment letter concerning Hawaiian Electric Company, Inc.'s (HECO's) Kamoku-Pukela 138-kV Transmission Line Project Revised Draft Environmental Impact Statement (RDEIS). Our responses to your individual comments follow. Your comment letter and this response letter will be included in the Revised Final EIS (RFEIS).

If from the standpoint of general aesthetics, there is conflicting information in Table 3-5, for the Waahila Overhead and Waahila Underground alternatives. The overhead alternative is rated as "Not Significant" visually while the underground alternative is rated as "Significant". Please explain how the underground alternative would have significant visual impacts but the overhead alternative would not.

In reviewing the level of visual impacts associated with the proposed action, the criteria contained in Section 11-200-12, Hawaii Administrative Rules (HAR), were used as a guide. They state that, in most instances, an action shall be determined to have a significant effect on the environment if it, "(12) Substantially affects scenic vistas and view planes identified in County or State plans or studies." General views that include Waahila Ridge from the H-1 Freeway and views from Tantalus toward Diamond Head are identified in a City and County of Honolulu study, "Oahu Urban Design Guide", prepared in the early 1980's. Based on an analysis of the RDEIS' visual stimulus from these two viewpoints, the proposed project would not substantially affect these two views. Nonetheless, the overhead portion of the proposed action and adjustment I would have an adverse impact on visual resources from a number of vantage points and the September, 1999 RDEIS summarizes the project's effect on visual resources as a negative impact.

With regard to the underground alternatives across Waahila Ridge, they would not have a substantial effect on these two views. We have corrected the discussion in the text of the RFEIS and in Table ES-1 and Table 3-5 to be consistent with this interpretation of the EIS rules. The overhead and underground alternatives along Waahila Ridge are shown on the tables as having an impact that is not significant.

Many individuals have expressed the opinion that the potential visual impact of the proposed action could "involve a substantial degradation of the environmental quality," as stated under 11-200-12(7), HAR, and thus could result in a significant adverse visual impact. Given the subjective nature of my visual resource assessment (beauty is in the eye of the beholder) and the rather vague and ambiguous significance criteria outlined in 11-200-12(7), HAR, the validity of this opinion is recognized in the RDEIS.

HECO continues to examine ways to further mitigate the potential impacts of the proposed project on the visual environment. As a result of comments received on the May 1998 Draft EIS, HECo has identified the possible relocation of several poles along the lower Waahila Ridge area to minimize the extent to which the new poles would change the existing profile view of the ridge line as a mitigation measure. HECo is also examining methods of painting both poles and conductors to minimize a person's ability to notice them within the surrounding environment. In addition, HECo is examining the use of landscaping to provide partial screening of the lower portions of the poles and create a greater diversity in the landscape.



June 15, 2000

Timothy E. Johns
State of Hawaii, Department of Land and Natural Resources

P.O. Box 611
Honolulu, HI 96809

Subject: Hawaiian Electric Company, Inc.'s Kamoku-Pukela 138-kV Transmission Line Project Revised Draft Environmental Impact Statement (September, 1999)

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As the accepting authority for the REIS, DLNR will evaluate all comments for content, relevance and reasonableness. When the final REIS is completed, we will then evaluate HE CO's response to these comments and will specifically consider the adequacy of each response.

HECO understands the role of your department in reviewing the acceptability of the REIS and will offer any assistance required to help you in your evaluation.

From Michael Wilton's Aug 7, 1998 Letter to Mark Wiley

Planning Branch: Our comments on the completed Draft Environmental Impact Statement (DEIS) for the Kamoku to Pukela 138-kV Transmission Line are not meant to be exhaustive since there are a number of other agencies, individuals and groups commenting on a wide spectrum of issues in the DEIS, which HE CO is required to address in the final document. The Department of Land and Natural Resources (DLNR) has commented on aspects of the DEIS which affect its program areas, and as the accepting authority, will review HECO's response to these and other comments to ensure compliance with applicable provisions of Chapter 343, Hawaii Revised Statutes.

As noted in the earlier response to your previous comment, HE CO understands the DLNR's role in the EIS process and offers any assistance required to help you in your evaluation.

The purpose of the DEIS is to disclose, discuss and mitigate project alternatives. The DEIS is not required to resolve every issue or agree with every view. Moreover, acceptance of the DEIS by the DLNR does not signify a staff position on the project nor obligate the DLNR to accept its conclusions and recommendations.

HECO understands that by the DLNR's acceptance, the DLNR is not taking a position on HE CO's conservation district use application pending before the department.

Staff evaluates all projects in the Conservation District based on a number of criteria and objectives pursuant to State law under Chapter 183C, Hawaii Revised Statues (HRS), and Section 13-5-30 (c), Hawaii Administrative Rules (HAR). Staff also considers comments received during the 45 day review period as well as information included in the EIS supported by field observations.

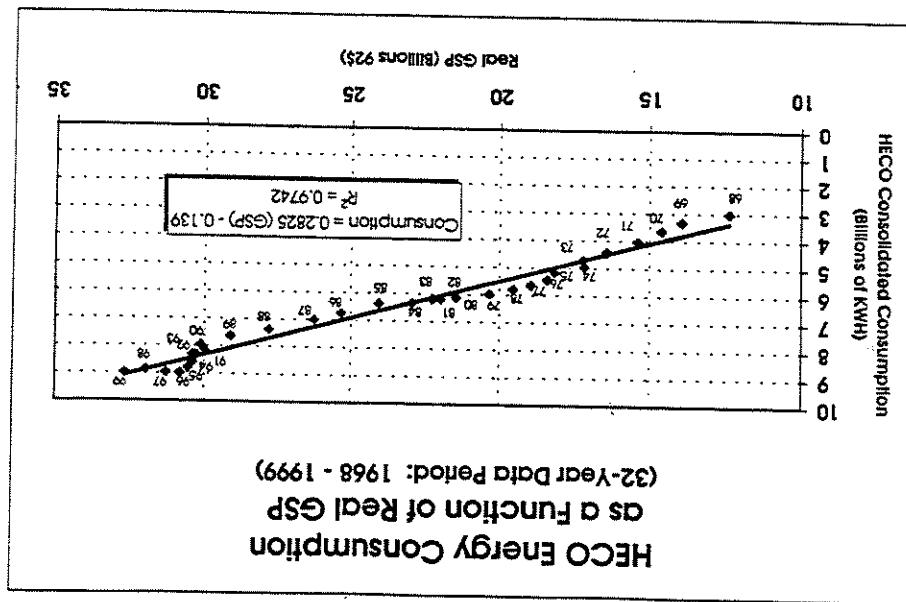
Section 5.5 of the EIS document discusses HRS Chapter 183C, which establishes the powers of the Board of Land and Natural Resources (BLNR) and the DLNR to grant permits for certain uses within the Conservation District. This statute is applicable since the proposed Kamoku-Pukela 138-kV Transmission Line passes through lands along Waahila Ridge designated as Conservation District.

The proposed action would pass through both the Limited and Resource Subzones. The alignment of adjustment 1 is not in the Conservation District, with the possible exception of Pole PA16 near Dole Street (which may be in the Limited Subzone). The objective of the Limited Subzone is "to limit uses where natural conditions suggest constraints on human activities." The Limited Subzone generally encompasses lands susceptible to floods and soil erosion, lands undergoing major erosion damage, and lands where it is necessary to protect the public from the susceptibility of tsunami inundation, volcanic activity, or landslides. Lands within the Limited Subzone often have slopes of 40 percent or more.

The objective of the Resource Subzone is to "develop, with proper management, areas to ensure sustained use of the natural resources of those areas." The Resource Subzone generally encompasses lands to be used as parks and outdoor recreation areas, lands suitable for growing and providing timber and forest products, and certain offshore islands and marine waters.

Under HAR 13-5-22, the construction of the proposed Kamoku-Pukela 138-kV Transmission Line would be classified as a public purpose use. Public purpose uses are defined as:

Transportation systems, transmission systems (emphasis added), energy generation facilities utilizing the renewable resources of the area, and communications system and other such land uses which are undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the conservation district.



Public purpose uses are identified uses in both the Limited and Resource Subzones as indicated in HAR 13-5.23(a) and 13-5.24(a), but require a permit approved by the DLNR.

When evaluating the merits of a proposed land use, HAR 13-5.30 outlines eight criteria that the BLNR shall apply. Those eight criteria and a description of the relationship between the criteria and the proposed Kamoku-Pukale 138-kV Transmission Line follow.

1. The proposed land use is consistent with the purpose of the Conservation District.

HAR Chapter 13-5, Section 22, acknowledges public purpose uses by public and private sectors through specific identified uses allowed in the Conservation District Protective Subzone, as well as all other less restrictive subzones. The DLNR (*In the Process of Revision and Proposed Changes, November 1994*) recognized that certain public purpose uses, such as "electric power, systems across mountain ranges," are required to occur in the Conservation District and that these public purpose uses often "are required to fulfill government mandates to protect the public health, safety, and welfare or for public utility requirements."

2. The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.

The proposed action would pass through the Limited Subzone and Resource Subzone. A portion of alignment I may pass through the Limited Subzone near Dole Street. The proposed Kamoku-Pukale 138-kV Transmission Line would be consistent with the objectives of the Limited Subzone because human activities would be constrained both during the data collection and construction phases and during periodic inspection and maintenance throughout the life of the installation.

The proposed action would be consistent with the objectives of the Resource Subzone because the placement of the proposed transmission line and poles in the same area as existing poles would not cause any impacts on the existing park lands or trail use, within the Waahila Ridge State Recreation Area, nor would the alignment adversely affect any likely possible future expansion to the recreation area. Currently, only one existing pole structure is located within the designated Waahila Ridge Trail. Access to the trail would be maintained following replacement of this structure. Further, because of the small footprint of the transmission line poles, the proposed action would have an insignificant impact on the subzone's capability for growing or harvesting commercial timber or other forest products and would have an insignificant impact upon any existing or likely future outdoor recreational uses.

Existing access to the Conservation District is limited to a small road through the Waahila Ridge State Recreation Area and various hiking trails. Most of the Conservation District in the project area contains no serviceable road. Those sections of the proposed action requiring installation of poles and lines in either the Limited or Resource Subzones would be constructed and maintained by crews who would access the area either by foot or by helicopter. The use of heavy equipment in the Limited or Resource Subzones may not be feasible because of the steep grades and lack of access roads. Small backhoes may be flown in and out by helicopter where terrain allows. Data collection and construction activities in the Limited and Resource Subzones would rely substantially on manual labor and extensive use of helicopters. Periodic inspection and maintenance would be conducted by crews who would inspect and maintain the lines and poles on foot or by helicopter. The limited land area disturbed during construction and the small footprint used for the poles would have an insignificant impact on flooding or soil erosion potential.

3. The proposed land use complies with provisions and guidelines contained in Chapter 205A, Hawaii Revised Statutes (HRS), entitled "Coastal Zone Management," where applicable.

The proposed action complies with HRS Chapter 205A, Coastal Zone Management, as discussed in Section 5.4 of the RDEIS. The project area is not located in the Special Management Area as administered by the City and County of Honolulu, Department of Planning and Permitting.

4. The proposed land use will not cause substantial adverse impacts to existing natural resources within the surrounding area, community or region

Construction of the proposed Kamoku-Pukale 138-kV Transmission Line within the Conservation District would most likely rely on manual labor and use of helicopters. Small backhoes may be flown in and out by helicopter where terrain permits.

Holes for pole footings would range from 5 to 7 feet in diameter, and the working area would range up to 25 feet in width. Depth of the holes for the pole footings would vary and depend upon soil type and support requirements. Concrete for the pole footings would be carried by helicopter, when necessary, from various staging areas to the pole sites. Helicopters would also be used to transport work crews and materials to and from the construction sites. Helicopters would function as aerial cranes to erect the pole sections and to assist in stringing conductors.

It is expected that the proposed action would not cause any significant impacts on the existing natural resources within the surrounding area, community, or region based on the following factors:

- Reliance on manual labor
- Use of helicopters
- Possible use of small backhoes flown in and out by helicopter
- Small areas that would be used for pole footings
- The temporary and limited area that would be disturbed during construction
- The temporary nature of the helicopter staging areas needed for construction
- The low intensity of activities associated with periodic inspection and maintenance

There were no listed threatened or endangered vegetation species and no candidate endangered species identified during surveys conducted for the project. No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed addition. Three dwarf koa trees (*Acacia koa*) were found adjacent to the project's easement. Dwarf koa trees are categorized under the "other species of concern" designation. They are readily available from in-state nurseries for purchase and use in replanting efforts. And additional field survey and analysis of flora concluded that the dwarf koa would not be adversely affected during construction because the trees are located about 50 feet away from the nearest pole construction site. During maintenance of the transmission line easement, the dwarf koa will only be trimmed if necessary with prior consultation and approval from the DLNR and the USFWS.

With respect to fauna, during the 1993 and 1998 surveys of wildlife, researchers identified no species within the Conservation District near the existing overhead alignment that are listed by federal agencies as endangered or threatened species or that are candidate species for such listings. The Neewell's Shearwater is on the federal list of threatened species and this species may occasionally fly over the project site on Wahihia Ridge; although there are no known sightings of the bird on Wahihia Ridge and no known nesting areas in the vicinity. The Oahu 'elepaio, a native bird recently listed as an endangered species by the USFWS and listed as endangered by the State of Hawaii, has been sighted four times within the last eight years by others within two kilometers of the Pukele Substation at elevations over 1,000 feet. The closest portion of the proposed transmission line would be one-half kilometer away from the range of this species. No habitat essential for the survival of the Oahu 'elepaio was discovered in the vicinity of the alternative alignments.

Present in the lower Wahihia Ridge area is the endemic Hawaiian *Sucineaa caerulea*, a "species of concern," and two species of endemic *Tommatellidae* (Achaenellidae). The *Sucineaa caerulea* occurred at its greatest abundance around the pole nearest to Dole Street and, therefore, disturbance in this area would be addressed. Along Wahihia Ridge, mobile crane access probably would be available only for

poles next to Dole Street (e.g., Pole P26), which are outside of the Conservation District. It is anticipated that all other poles along Washita Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mainly by helicopter), impacts on the inverters related to installation of the new power line would not be great. For poles installed by helicopter, only the areas actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Washita Ridge area since the *Societas eradicata*, a species of concern, was found in this area. The biologist will be able to identify the *Societas eradicata* if it is found and make recommendations to the work crews to minimize disturbances.

5. The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding areas, appropriate to the physical conditions and capabilities of the specific parcels or parcels.

The proposed land use for the Kamoku-Pukela 138-kV Transmission Line involves transmission lines and poles that are consistent with the current utility land use within the existing HECO easements through the Conservation District. No buildings or other structures would be involved with the proposed action in the Conservation District.

The proposed action would involve the replacement of existing 46-kV subtransmission conductors and poles with new poles that would accommodate the existing 46-kV subtransmission system and the new 138-kV transmission system. The proposed transmission lines and poles would follow the same general alignment as the existing 46-kV subtransmission line easement. However, adjustment of the easements on lower Washita Ridge may be pursued to shift the precise locations of some poles for visual mitigation.

In response to comments on the May 1998 Draft EIS, HECO made a commitment in the December 1998 Final EIS to investigate the possibility of "relocating portions of the alignment along the lower Washita Ridge area to minimize the extent to which the new poles would change the existing profile view of the ridge line" as a mitigation measure. As a result of this commitment, HECO has identified an adjustment to the proposed action's alignment (adjustment 1) on lower Washita Ridge that would substitute new poles at lower elevations to the east of the existing 46-kV easement to minimize changes to the profile of the lower ridge. The alignment of adjustment 1 is not within the Conservation District, with the possible exception of Pole PA16 near Dole Street.

The use of generally the same transmission line easements as the existing 46-kV subtransmission line would ensure that the transmission line and poles would be compatible with the surrounding areas and would be appropriate to the physical conditions and capabilities of the specific parcels that would be affected by this proposed project. Land use activities within and adjacent to the transmission line easement would be permitted within the terms of the easement. Incompatible activities within the right-of-way would include constructing buildings or structures, drilling wells, growing trees that could interfere with the overhead conductors, performing improvements that may interfere with line operation and maintenance, or conducting other activities that may compromise safety.

6. The existing physical and environmental aspects of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, whenever is applicable.

Several overhead subtransmission lines currently exist along the route of the proposed action, and construction of the Kamoku-Pukela 138-kV Transmission Line would not introduce an entirely new visual element to the Conservation District. Within the Conservation District, it is proposed that the existing 46-kV transmission lines (Pukela 7 and 8) be consolidated as much as practicable with the proposed 138-kV transmission line. The higher voltage transmission lines would be placed below the higher voltage lines on the new poles. Some of the views from within the Washita Ridge State Recreational Area would remain essentially the same as the existing views of poles and conductors. From other viewpoints, the higher steel poles and additional conductors and shield wire would increase the negative effect the existing poles and conductors have on the visual quality of those views. General

views that include Washita Ridge from the I-1 Freeway and views from Taniatus toward Diamond Head are identified in a City and County of Honolulu study, *Ordn Uhan Design Guide*, prepared in the early 1980s. Based on an analysis of the RDEIS' visual simulations from these vantage points, the proposed project would not substantially affect these two views.

With the proposed action, the natural beauty and open space characteristics of the land would be maintained to the maximum extent possible in both the Limited and Resource Subzones. This would be accomplished by constraining activities, both during construction and during periodic inspection and maintenance, and by placing the overhead transmission line such that the existing park lands in the Washita ridge State Recreation Area—or any likely possible future expansion to this recreation area—would not be affected.

7. Subdivision of land will not be utilized to increase the intensity of land uses in the Conservation District.

No subdivision of land within the Conservation District would occur with the proposed action for the Kamoku-Pukela 138-kV Transmission Line.

8. The proposed land use will not be materially detrimental to the public health, safety and welfare.

The work area for the proposed Kamoku-Pukela 138-kV Transmission Line is bordered by two residential areas and traverses a portion of the Wahila Ridge State Recreation Area. These areas may be sensitive to the noise impact and to the possible safety considerations of the helicopters that would be used for construction. State Department of Health noise guidelines would be followed and the necessary approvals obtained to comply with the regulations regarding these temporary noise impacts from the use of the helicopters and other equipment during construction. Federal Aviation Administration and State Department of Transportation safety guidelines would be followed for the use of helicopters for construction and periodic inspections and maintenance.

The impacts of the project would be most pronounced during construction. These impacts would be mitigated so that adverse noise or safety hazards would be minimized. It is anticipated that impacts to the public health, safety, and welfare after construction is completed would be insignificant and not materially detrimental.

As a matter of practice, the Department and Board are predisposed to consider public purpose uses by a different standard than nonpublic purpose uses. This is because some projects serve a broad public service and are deemed essential, unlike projects that serve the needs of a select group or a private entity. If a project is considered essential and there are no other feasible alternatives, one must consider the costs of utilizing the resource to meet the need. But this must always be weighed against the project's impact on conservation values. This is why, under Title 13-5, BAR, public purpose uses are identified in the Protective "P" Subzone of the Conservation District and why other types of intensive or intrusive uses that do not serve a public purpose, are not identified in the "P" Subzone.

Under HAR 13-5-22, the construction of the proposed Kamoku-Pukela 138-kV Transmission Line would be classified as a public purpose use. Public purpose uses are defined as:

Transportation systems, transmission systems [emphasis added], energy generation facilities utilizing the renewable resources of the area, and communications system and other such land uses which are undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the conservation district.

Public purpose uses are identified uses in both the Limited and Resource Subzones as indicated in HAR 13-5-23(a) and 13-5-24(a), but require a permit approved by the BLNR.

When evaluating the merits of a proposed land use, HAR 13-5-30 outlines eight criteria that the BLNR shall apply. Those eight criteria and a description of the relationship between the criteria and the proposed Kamoku-Pukela 138-kV Transmission Line are discussed in the response to your preceding comment.

This requires the analyst to judge the project from two perspectives and why we must consider project need and project alternatives. First, the project must be evaluated from the perspective of Conservation District objectives (e.g., does the project conform to our permit criteria listed in I-5, HAR); and second, does the project support a broad public need that can only be served by utilizing Conservation District resources. Ultimately the analysis must evaluate public purpose projects based on a range of trade-offs. For example, the conservation of natural resources, including vegetation or flora/fauna, versus public need. In most cases, the project need must be clearly established on the project with foil, in order to better understand the various trade-offs, the Board of Land and Natural Resources must be fully informed of the essential need for the project and also the cost of alternatives before it can render a decision to commit resources for such a purpose.

Please see the earlier response to your comment regarding compliance with the Conservation District Objectives. Based on HECo's evaluation, HECo believes that the proposed action does comply with these objectives.

With respect to the need for this project, several studies between 1983 and 2000 addressed the reliability of HECo's transmission system island-wide, including the area serviced by the Ko'olau, Iwilei, School Street, Archer, and Pukela substations (defined as the East Oahu Service Area). Various alternatives for meeting HECo's reliability requirements were examined. These studies recommended the construction of an additional transmission line corridor over the southern portion of Oahu connecting power plants in Leeward Oahu to the rest of the island.

Currently, HECo transmits bulk power from the Leeward Oahu power plants in the East Oahu Service Area over two major transmission corridors. The Northern Transmission Corridor extends from the Kahle Power Plant to the Halewa Substation, to the Ko'olau Substation, and to the Pukela Substation in Pa'ilo, where it ends. The Southern Transmission Corridor extends from the Kahle Power Plant to the Waialae Power Plant and the Iwilei, School Street, and Archer substations, ending at the Kaimoku Substation. These two major transmission corridors are linked together by transmission lines between the Kahle Power Plant, the Halewa Substation, and the Waialae Power Plant to form a ring of transmission lines that provides reliable power to the West Oahu Service Area. However, no such connection exists between the Northern and Southern corridors to provide reliable power to the East Oahu Service Area. The proposed Kamoku-Pukela 138-kV Transmission Line would close the gap between the Northern and Southern Transmission Corridors.

By closing this gap with a new transmission line connecting the Kamoku and Pukela substations, HECo would be able to:

- Provide a primary benefit by supplying the Pukela Substation with electricity over an entirely separate transmission line corridor, providing an alternative to the existing two transmission lines crossing the Ko'olau Mountains.
- Prevent overloading of existing circuits to the Ko'olau Substation (a primary benefit) and to the Iwilei and School Street substations (a secondary benefit), which collectively serve 36 percent of Oahu's electrical load.
- Greatly enhance the reliability and operational flexibility of the 138-kV system by creating a 138-kV transmission system loop serving Windward and East Oahu as a secondary benefit.
- Provide a secondary benefit by supplying additional transmission capacity via an alternative route to meet the projected load growth within the East Oahu Service Area.

The need to close this gap has been recognized by a number of outside agencies including:

1. The PUC, which recognized the reliability benefits of the line in its Decision & Order No. 12677, Docket No. 7602, issued September 24, 1993: "The new circuit will also provide a third feed to the Pukela substation, the most heavily loaded 138-kV substation in the HECo system. This will improve system reliability and will ultimately benefit ratepayers."

2. The State Department of Commerce and Consumer Affairs' Division of Consumer Advocacy, which recognized the reliability benefits of the line within its "Consumer Advocate's Amended Statement of Position" to Docket No. 7602, issued on May 3, 1993: "The new 138-kV circuit will also provide a third feed to the Pukela Substation which is the most heavily loaded 138-kV route. This second route will increase system reliability which will ultimately benefit ratepayers."
3. The U.S. Department of Energy's Office of Emergency Management, which recognized the need for the line through its post-Hurricane Iwaikani Hawaiian Islands Hazard Mitigation Report, prepared for the State of Hawaii and in which it made recommendations to "close the radial transmission loops on Oahu." The Kamoku-Pukela line would comply with this recommendation.
4. The State Department of Business, Economic Development & Tourism, which cited the *Hawaiian Islands Hazard Mitigation Report* recommendation to close Oahu's radial transmission system in its July 23, 1996, Draft EA response letter from its Office of Planning contained in Appendix N of the September 1999 RDEIS and indicated that the proposed action would comply with that recommendation.

Providing a new transmission line to connect the Pukela and Kamoku substations would improve reliability consistent with the findings of these agencies as well as HECo's standards related to transmission reliability. These standards are also consistent with the Planning Standards of the North American Electric Reliability Council, a non-profit international organization formed in 1968 to promote the reliability of electrical supply for North America.

The Pukela Substation currently services approximately 18 percent of Oahu's electrical load, mainly in the neighborhoods of Manoa, Saint Louis Heights, Palolo, Kalihi, Kaimuki, McCully, Moiliili, and Waikiki. Even though the Pukela Substation serves one of the most important economic areas in the state (Waikiki), HECo does not have a back-up 138-kV transmission corridor to the Pukela Substation. The two existing transmission lines connect Pukela to the island-wide transmission system via just one substation (the Ko'olau Substation) and one transmission corridor. These two existing transmission lines are more than 30 years old and traverse the mountainous Ko'olau Range with limited access and constant exposure to high winds and corrosive weather conditions. Failure of either of these transmission lines while the other is out for maintenance would leave the Pukela Substation with no alternate corridor over which to receive electricity from a different substation (that is, the Kamoku Substation). The existing powerlines on Waialae Ridge are 46-kV subtransmission lines that are not sufficient to address the need.

The consequences of not connecting the Kamoku and Pukela Substations with a new 138-kV transmission line are outlined in the September 1999 RDEIS as a no-action alternative. In that scenario, loss of electricity to the entire Pukela Substation Service Area would occur should the two transmission lines feeding the substation be out of service simultaneously. In addition, continued growth in electrical demand in the East Oahu Service Area would result in the following system problems:

- Overloading of the third 138-kV transmission line to Ko'olau Substation, when the other two 138-kV transmission lines are out of service, projected in the year 2002
- An overload of the third 138-kV transmission line to the downtown load center, when the other two 138-kV transmission lines are out of service, projected to occur in the year 2016 or by 2005, if the Honolulu Power Plant is retired early

Regardless of actual future population growth, the proposed transmission line would still be needed to improve reliability in the East Oahu Service Area by closing the gap between the Northern and Southern Transmission Corridors. The project would not have an effect on the amount of electricity generated or consumed because its function is to transmit electricity, not to generate power. The beneficiaries in the East Oahu Service Area include residential, business, and institutional (e.g., government and school) customers. The Hawaii Public Utilities Commission, with participation by the

State's Consumer Advocate, will determine the need for the project and HEICO's rates. No one entity or customer class would unfairly benefit from, or pay for, the project.

More information on the purpose and need for the project can be found in Section 2.0 of the September 1999 RDEIS.

Prior to the selection of the proposed action, HEICO evaluated a series of alternatives to address reliability issues for the East Oahu Service Area. These alternatives are more fully discussed in Section 3 and Appendices B and C of the September 1999 RDEIS. In summary, these alternatives included demand/conervation alternatives, power generation and storage alternatives, transmission and distribution system alternatives, a no action alternative, and a deferred action alternative. After examining these alternatives, HEICO selected the proposed action because it best balanced environmental, economic, social, and engineering concerns, as well as meeting the project's objectives.

With respect to constructing a 138-kV transmission line between the Kamoku and Pukela Substations, HEICO evaluated 11 different routes, technologies, and configurations of overhead and underground lines. A discussion of the alternatives follows.

Alternative Routes and Technologies to Connect Kamoku and Pukela Substations

There are three technically feasible methods of constructing a 138-kV transmission line between the Kamoku and Pukela Substations: (1) conventional overhead construction; (2) high-pressure fluid-filled pipe (HPFP) underground construction; and (3) solid dielectric, cross-linked polyethylene (XLPE) underground construction. Combining overhead construction with either one of the underground construction technologies is also technically feasible. For example, transmission lines can be underground along one segment of an alignment or route, and then be overhead along another segment of the alignment with the addition of either a transition station (for an HPFP system), or a ricer pole (for a solid dielectric, XLPE system).

In addition to three different construction technologies, there are a variety of ways to route the transmission line from the Kamoku Substation to the Pukela Substation. Work leading up to the publication of the May 1998 Draft EIS focused on developing the alternatives based on alignments and technologies (with community participation), analyzing those alternatives in detail, and selecting a proposed action based on that analysis. The following 11 transmission line alternatives were selected for evaluation:

- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative (proposed action)
- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-King Street-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-Dole Street-Waahila Ridge overhead alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-Palo Alto Avenue HPFF underground alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFF combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFF combination Alternative

Demand-Related Alternatives

Demand-side Management. Demand-side management (DSM) programs attempt to encourage customers to conserve electrical use by providing various financial incentives. By conserving the amount of energy used by the consumer, the amount of electricity generated can be reduced. HEICO has already developed DSM programs and has developed a 20-year, long-range plan, the *Integrated Resource Plan (IRP), 1998-2017*, combined with a 5-year action plan. Over the next 5 years, HEICO's current energy-efficient DSM programs are forecast to reduce the annual growth in demand for additional electricity by approximately 1/2 to 1 percent. While this dampening could defer transmission line overloading issues in a 1- to 5-year time period, eventually demand would grow to a point where the overloading problem would reappear. In addition, the reliability issue facing the Pukela Substation would not be addressed by relying solely on DSM measures.

Revisions to the Load Forecast. HEICO regularly produces and updates forecasts on Oahu's projected electrical use. Through these forecasts, HEICO identifies potential overloading problems that need to be addressed. Downward revisions in the projected amount of electrical use could move back the date of anticipated overloads. However, unless demand for additional electricity were to stop altogether, revisions to numbers are unlikely to prevent the overload from occurring. In addition, the reliability issue facing the Pukela Substation would not be addressed by this alternative.

Generation-Related Alternatives[#]

Generation-related alternatives consist of various alternative and conventional technologies to produce electricity in East Oahu. By placing generation capabilities in East Oahu, energy could be produced to meet the growing demand in the region and provide an additional source of power independent of the West Oahu transmission line feeds, thus providing increased reliability. However, it should be noted that generation-related alternatives also require transmission systems to deliver the power to customers, which might raise new generation facility and transmission line siting and permitting issues. In addition, most of the following generation-related alternatives might solve some, but not all, of the reliability problems identified for the project.

Wind. Wind energy conversion systems convert wind energy into electricity by collecting the wind's kinetic energy with blades connected to a drive shaft that turns a turbine generator. Wind is not a firm source of energy. Therefore, wind must be accompanied with an energy storage device at an additional cost to be able to provide a reliable supply of energy during no wind periods. In addition, finding suitable wind sites near the Pukela substation service area would be very difficult. On Oahu, the best wind sites identified in the 1980s were along the tips of the island (Kahuku and Kileau Point). These installations would be along the ridgelines of the Ko'olau and Waianae mountain ranges. There are no feasible East Oahu wind sites available unless one proposes to install wind turbines near Makapuu or the main Ko'olau ridge line from Manoa to Hawaii Kai. No wind developer has shown any interest in these areas.

Wind energy conversion systems depend upon adequate winds to drive the system and require approximately 3 acres per 500-kilowatt turbine. Therefore, to meet the 200-MW demand represented by the Pukela Substation, more than 7200 acres would be required within East Oahu with initial construction (capital) costs estimated at more than \$210 million. Such large land requirements and high cost made this alternative impractical within the East Oahu area.

Pumped Storage Hydropower. This technology requires that water be pumped during low-power demand periods from a lower reservoir to a higher reservoir. That water would be released during periods of high power demand to turn turbines and generate electricity. Two areas were considered adequate for such use in East Oahu: Koko Head Crater and Kaua Crater. Costs to convert the craters to reservoirs would range from \$160 to \$260 million. The high costs and significant adverse environmental impacts associated with submerging the inner crater habitats made this alternative unacceptable.

Solar. Electricity can be generated from sunlight through the use of photovoltaic (PV) cells or solar thermal energy conversion. Solar power is not a firm energy source and operates only when the sun is shining. As such, grid connected photovoltaic systems (without batteries) are not base load facilities. HECO is not aware of any commercial photovoltaic base load facility (with battery or other energy storage device) on a grid-connected system. Approximately 5 to 10 acres of land would be required to house the equipment necessary to generate one MW of electricity. To generate the necessary 200 MW for this project, between 1,000 and 2,000 acres of relatively flat land would be required. In addition, capital costs for such a large-scale solar-based system are estimated to be between \$1 billion and \$2 billion. Such high costs and land requirements make this an impractical alternative. On a smaller scale, solar power systems at each customer's location could be used to help reduce both the energy and peak demands on the system. While this alternative might reduce system loads, customers would still need to rely on the transmission and distribution system for reliable electrical service.

Battery Energy Storage. A battery energy storage system can store excess energy and release that energy as required. Systems consist of banks of batteries that supply power to the system for approximately 4 to 5 hours. About 20 acres of land would be required to house the batteries necessary to provide 200 MW of power to East Oahu with an estimated installation cost of approximately \$186 million. Generally, use of such battery systems is environmentally benign. However, the quick depletion rate of the batteries does not make them a reliable backup system should a transmission line fail. This alternative was therefore considered impractical.

Fuel Cells. Fuel cells are devices that produce energy by creating a reaction within an electrolyte substance using a combination of heat and a chemical agent. Applications of this technology are limited and are still, for the most part, in the demonstration stage. HEKO has been tracking the progress of Ballard Power Systems as well as other fuel cell manufacturers and developers. HEKO has visited many manufacturing plants and demonstration projects and held discussions with the personnel of these facilities on future plans for their fuel cell products. The four major classes of fuel cells currently undergoing development are phosphoric acid fuel cells (PAFC), molten carbonate fuel cells (MCFC), solid oxide fuel cells (SOFC), and polymer electrolyte membrane fuel cells (PEMFC). Currently, ONSI is the only company to offer a commercial fuel cell unit. The price of ONSI's 200-kW PAFC fuel cell isid approximately \$4,250 per kW. Fuel cells are being developed to use hydrogen, natural gas, or propane. In Hawaii, synthetic natural gas or HD-5 grade propane would need to be used.

Recent applications of this technology include the 11 MW PAFC facility in Japan (1991) which required about 1 acre of land and the 1 MW PAFC facility in Alaska (1999) which required about 0.14 acre of land. To generate the necessary 200 MW for this project in a central plant fashion utilizing ONSI's 200-kW PAFC fuel cell std, approximately 18 to 30 acres of land would be required to meet project needs, and capital costs would range from \$600 million to \$850 million. The development of fuel cell technology from a demonstration stage into a viable and affordable commercial application is not anticipated to occur within the timeframe to address the East Oahu electrical needs.

Ocean-Derived Energy. Energy from the ocean can be produced through either ocean thermal energy conversion or ocean wave energy conversion. Ocean energy conversion systems require large facilities on the shoreline, and capital costs to meet project needs would range from \$1.2 to \$2.6 billion. The use of ocean thermal energy conversion within East Oahu appears to be limited for several reasons; the lack of available commercial-sized applications, the limited power production from the technology, the controversies surrounding use of available shoreline property, and the potential environmental impacts on the off-shore and near-shore habitats.

Biomass Conversion. Biomass generating facilities use organic matter that is available on a renewable basis as fuel in direct-fired, steam-electric power plants. When the sugar industry had a strong presence on every island, biomass-generated electricity was a prime and very large renewable energy contributor in Hawaii. Capital costs for a typical biomass plant of the size necessary to meet project needs could range from \$340 to \$460 million. Approximately 5,200 dry tons per day of fuel and 16 million gallons of water per day would be required to meet project requirements. There are no land

and water resources available in East Oahu for a biomass plant. About 56,000 acres of crop are needed for a 200 MW biomass plant (assuming an energy cane crop). These concerns, as well as the overall costs associated with construction and operation of a biomass facility, did not make this alternative viable.

East Oahu Base Load Facility. This alternative would consist of locating a large, 200-MW base load generation facility in East Oahu. The facility would be either coal- or diesel-fired. Approximately 30 acres of land would be required for the plant and related fuel storage areas. Capital costs would range from \$280 to \$460 million. Several studies have considered siting such a facility in East Oahu; however, the air emissions restrictions, incompatible surrounding land uses, and the need to truck fuel over long distances through densely populated areas, have made such a facility unrealistic.

Honolulu Power Plant Renovations [Distributed Generation]. This alternative would consist of retaining the Honolulu Power Plant and refurbishing and re-powering the existing turbines. The resulting additional capacity could then be fed back into the system. However, creating additional capacity would require approval of new air quality permits for the plant. Approval would be unlikely given the plant's proximity to high-density residential units. Even if approval were obtained, this alternative would not address the reliability issues facing the Koolau and Pukele Substations.

Combined Alternatives (Distributed Generation). The 1995 Kamoku-Pukele 138-kV Transmission Alternatives Study (Appendix C1 of the 1999 RDEIS) evaluated a combination of alternatives to replace or defer the Kamoku-Pukele 138-kV Transmission Line project. The combination of alternatives evaluated included aggressive demand side management (DSM), updated forecasts, increased maintenance, fuel cells, and a battery energy storage system. It was concluded in 1995 that the combination of alternatives would cost in excess of \$180 million, making this proposal impractical to replace or defer the proposed project.

Since the 1995 study, there have been more discussions in the utility industry on the concept of distributed generation (DG) or distributed power. DG could be implemented with a combination of different technologies depending on the technical objectives and physical parameters of a project. DG is defined as "retail power" sold either on or in close proximity to the end-use customer's premises, either by customers, an energy services provider or other third-party which owns, operates, and contractually controls the use of generation asset. "Retail power" implies the generation asset's output is dedicated and its operating regime is tailored to the needs of specific customers or specific aggregated loads assembled contractually by the energy service provider or by the implementer of the resource. The technologies that are typically associated with DG are internal combustion engines (ICEs), microturbines, and fuel cells. Other technologies such as photovoltaics (PV), battery energy storage, or wind power can also be associated with DG. However, for the purpose of analyzing the potential of such technologies as a DG source alternative to the proposed action, these technologies were screened out on a cost, technical and/or practical basis.

HECO evaluated a variety of scenarios to implement DG as a practical alternative to the project and assumed that at least 39 MW of emergency generating capacity already exists in the Pukele substation service area. These scenarios included the installation of 161 MW of all-ICEs, of all-microturbines, of all-fuel cells, and a portfolio (combination) of ICEs, microturbines, and fuel cells. The cheapest DG scenario was the installation of all-ICEs, which had an estimated capital installed cost ranging from \$81 million to \$161 million. The most expensive DG scenario was the installation of all-fuel cells, which had an estimated capital installed cost ranging from \$161 million to \$805 million. The estimated capital installed costs for the all-microturbines scenario ranged from \$145 million to \$25.8 million. The portfolio of ICEs, microturbines and fuel cells scenario ranged from \$122 million to \$343 million.

The cheapest DG scenario, the installation of all-ICEs, was not considered a practical alternative because of the high costs and the feasibility of installing ICEs in the residential and commercial areas of the Pukele substation service area. In regards to high costs, the installation of all-ICEs was estimated to be \$350 million to \$150 million more costly than the proposed action and \$25 million to

\$105 million more costly than the most expensive transmission line alternative (Kapiolani Blvd., Lower Campus-Waahila Ridge XLP, underground). In regards to feasibility, approximately 80 to 100 GEs (depending on size) may have to be installed throughout residential and commercial areas of Manoa, Saint Louis Heights, Palolo, Kaimuki, Kepahulu, McCully, Moiliili, and Waikiki. Given the air emissions and noise associated with GEs, it is unlikely that GEs would be a permitted or highly desirable use in these areas.

The installation of a portfolio of GEs, microturbines and fuel cells, was also not considered a practical alternative because of the high costs and other implementation hurdles. Given the advantages and disadvantages of the DG technologies, existing zoning regulations and the market directions of the different DG technologies, it was determined that large customers could be served by GEs, commercial/governmental service customers by microturbines, and residential customers by fuel cells. Given this criteria and the composition of the 60,000 customer accounts in the Pukela Substation service area, it was calculated that 67 MW of GEs, 57 MW of microturbines and 37 MW of fuel cells would need to be installed. This amounted to an estimated initial capital installed cost range of \$122 million to \$143 million in comparison to the proposed action of \$31 million.

There are additional technical and environmental issues associated with the implementation of a DG portfolio that cause it to be an impractical alternative. These issues include fuel supply, siting, operations and maintenance, electrical interconnection, permitting, other costs, load diversity and downtown overloads.

Given the high capital costs (\$81 million to \$805 million) and the numerous technical uncertainties, DOE is not a practical alternative to the proposed action (\$31 million) of constructing a 138-kV line between Kamoku and Pukela substations.

Transmission and Distribution System Alternatives

Undersea Cable. This alternative would consist of installing an undersea cable from Barber's Point to the Kamoku Substation. Estimated cost for the cable would be approximately \$149 million in 1994 dollars. This alternative would relieve the overloading problems at the Twelfth and School Street Substations. However, it would not provide an additional feed to the Ko'olau and Pukela Substations and, therefore, would not ensure any measure of greater reliability to the Pukela Substation. Should both Ko'olau-Pukela transmission lines be out simultaneously, the Pukela Substation would still drop out of service. In addition, this alternative would result in significant adverse impacts to the near-shore marine environment. For these reasons, this alternative has been eliminated from further consideration.

Reduced Pukela Service Area. This alternative would consist of reducing the demand on the Pukela Substation by transferring load to 16-kV transformers within the Kamoku and Archer Substations. The cost of this alternative would be approximately \$60 million. System reliability problems at Kamoku Substation would not be met since Kamoku would have only one feed and power could not be transferred from Pukela to Kamoku. In addition, the instances of low voltage drops would increase, which have the potential to damage sensitive electrical equipment in homes and businesses. The costs of this alternative, along with its deferral of the overloading problem by only 2 years, made this solution impractical.

Kamoku-Pukela 46-kV Network Alternative. This alternative would require the reconfiguration of the existing 46-kV subtransmission system to provide a transmission path between the Kamoku and Pukela Substations. Duplicate 46-kV transformer capacity would be installed at the Kamoku and Pukela Substations, and current flow direction between the two substations would be manually switched during times when the 138-kV transmission lines were out of service. The cost of this alternative is estimated at more than \$30 million. This alternative meets the project need relating to the reliability of the Pukela Substation and also relieves the projected overloading of the Ko'olau Substation. However, this alternative would accelerate the overloading conditions on the downtown substations by 2 years. Addressing the downtown substations' overloading issues would require

additional capital costs. In addition, a technical analysis of this alternative suggests that its implementation would increase the number of transformer short circuits, voltage drops, and transmission line losses because, over the long term, the 46-kV system would not be capable of handling the large amounts of electrical power being transmitted at peak times.

Halawa-Pukela 138-kV Transmission Line. This alternative would consist of constructing a single-circuit 138-kV transmission line from the Halawa Substation to the Pukela Substation. The cost of this alternative is estimated at more than \$30 million. This alternative would help alleviate the overloading problems at the Ko'olau Substation and would provide the necessary reliability to the Pukela Substation. However, the transmission line would not address the overloading problems at the downtown substations, nor would it provide the necessary reliability to the Kamoku Substation. Separate and additional 138-kV transmission lines would need to be constructed to address these individual concerns.

Increased Maintenance and Security. Increasing maintenance and security procedures could reduce the number of transmission line faults that occur. Although greater maintenance and security could help reduce problems before they occur, this alternative does not address the greater problems of projected overloads and required reliability.

No Action Alternative

Under the no action alternative, a 138-kV transmission line would not be constructed between the Kamoku and Pukela Substations. In that scenario, loss of electricity to the entire Pukela Substation Service Area would occur should the two transmission lines feeding the substation be out of service simultaneously. In addition, continued growth in electrical demand in the East Oahu Service Area would result in the following system problems:

- Overloading of the third 138-kV transmission line to Ko'olau Substation, when the other two 138-kV transmission lines are out of service, projected in the year 2002.
- An overload of the third 138-kV transmission line to the downtown load center, when the other two 138-kV transmission lines are out of service, projected to occur in the year 2016 or by 2005, if the Honolulu Power Plant is retired early.

The no action alternative would not meet the purpose and need criteria established for this project and would increase the risk of major electrical system outages in the near future. For this reason, it is not a viable alternative.

Deferred Action Alternative

The deferred action alternative assumes that the 138-kV transmission line would be constructed between the Kamoku and Pukela Substations at a later date than the projected timetable. Delaying the construction and startup of this transmission line would increase the risk of a major electrical system outage in the East Oahu area from forecast overloads during emergencies at the Ko'olau Substation and the downtown substations should HECO retire the Honolulu Power Plant. In addition, further delay in solving the reliability problem of the Pukela Substation would only serve to increase the risk of an outage caused by the failure of either one of the two transmission lines serving the substation while the other is undergoing maintenance. Although the deferred action alternative would eventually meet the purpose and objectives outlined for this project, the delay would burden HECO customers with additional costs and a greater risk of outages than would construction of the project under the existing schedule. For this reason, the deferred action alternative was not considered viable.

For more information concerning the topic of alternatives as they relate to the proposed Kamoku-Pukela 138-kV Transmission Line Project, refer to Section 3.0 of the September 1999 RDEIA.

Project Need:

It appears that primary reason for the new 138-kV line between the Pukela and Kamoku substations is to increase system redundancy to avoid future system overloading and potential power outages. Of a secondary nature appears to be the projected increase in demand for electricity in the service area. These two aspects of the project are related inasmuch as new load demand may have a negative effect of HECCO's ability to service clients. We have several questions on both issues.

Your description is partially correct. Please see the response above with respect to the need for the project.

HECCO has a regulatory and contractual obligation to provide reliable electric service at the lowest reasonable cost. In fulfilling that obligation, HECCO believes that the Kamoku-Pukela Line is needed and that the need has been justified. In the past, the BLNRR has deferred to the Public Utilities Commission (PUC) to determine the need for transmission facilities proposed by HECCO. With respect to the Kamoku-Pukela Line, the need has been recognized by the PUC who recognized the reliability benefits of the line in Decision & Order No. 12627, Docket No. 7602, by stating, "The new circuit will also provide a third feed to the Pukela substation, the most heavily loaded 138-kV substation in the HECCO system. This will improve system reliability and ultimately benefit ratepayers."

It should be noted that the PUC has been granted under State law the sole jurisdiction to regulate public utilities. Specifically, the PUC derives its authority over public utilities from H.R.S. § 269-6, which states:

The public utilities commission shall have the general supervision hereinafter set forth over all public utilities, and shall perform in the duties and exercise the power imposed or conferred upon it by this chapter.

Included in these broad powers is the PUC's authority to examine and to investigate and enforce HECCO's compliance with the provisions of the Hawaii public utilities law (H.R.S. Chapter 269), the PUC's rules, orders, and requirements, and HECCO's franchise (H.R.S. § 269-7 & 269-15). In performing his duties, the PUC must determine whether a facility or property that the public utility is seeking to include in the utility's rates is public necessity. Descriptions of the PUC's authority to determine the necessity of a utility's facility can be found in the Hawaii Revised Statutes, within HECCO's own franchise, and the PUC's rules.

For example, the PUC is given explicit authority: (1) "to examine the manner in which [each public utility] is operated with respect to the safety or accommodation of the public" (H.R.S. § 269-7); (2) to determine whether "changes, extensions, or repairs are desirable in a public utility's plant or service to meet the reasonable convenience or necessity of the public, or to ensure greater safety or security" (H.R.S. § 269-15); and (3) to "regulate a manner in which the property of every public utility is operated with respect to the safety and accommodation of the public" (H.R.S. § 269-15(b)). In investigating the reasonableness of a utility's rates and to approve increases in rates, the PUC is allowed to provide a fair return on a utility's property that is "actually used or useful for public utility purposes" (H.R.S. § 269-16(b)).

In addition, pursuant to its franchise, HECCO is granted the right to furnish electric power on the island of Oahu and to install poles, wires, conduits, and other facilities in public rights-of-way for the transmission, distribution, and supply of electricity. In return, a franchise fee is paid to the county and HECCO is under an obligation to extend service whenever it shall be made to appear that said extension is a public necessity and that said extension or extensions can be made to earn a reasonable profit on the cost and maintenance of the same."

Finally, pursuant to Hawaii State law, the PUC has promulgated rules for reviewing the need for electric utility plant projects costing in excess of \$500,000. The PUC has examined the need for transmission line facilities in numerous proceedings, and has considered and determined the appropriateness of constructing such lines overhead or underground. See, for example, Re Hawaiian Electric Co., Docket No. 7526, Decision & Order No. 13201 (April 7, 1994, reported at 151 P.U.R. 4th 30 [Haw. PUC 1994]), aff'd 81 Haw. 459, 918 P.2d 561 (1996).

The PUC's exclusive jurisdiction over the issues regarding the need for and rate impact of public utility facilities is compelling based on an examination of Chapter 269, Hawaii Revised Statutes. In addition, the PUC's exclusive authority over public utilities has been confirmed by the Hawaii Supreme Court, which

held that the Legislature intended to restrict such powers over public utilities to the PUC and had preempted the power of the counties to regulate the height of poles under its zoning authority. Thus, the fact that the PUC, which has sole jurisdiction over public utilities and the need for facilities, has recognized the reliability benefits of HECCO's project is a compelling reason to construct the Kamoku-Pukela Line. It should also be noted that the Consumer Advocate, the U.S. Department of Energy's Office of Emergency Management, and the State of Business, Economic Development & Tourism have also supported and recognized the need for the Kamoku-Pukela Line as follows:

1. The State Department of Commerce and Consumer Affairs' Division of Consumer Advocacy, which recognized the reliability benefits of the line within its "Consumer Advocate's Amended Statement of Position" to Docket No. 7602, issued on May 3, 1993: "The new 138-kV circuit will also provide a third feed to the Pukela Substation which is the most heavily loaded 138-kV substation on the HECCO system (19 percent of the total system load) via a second and diverse route. This second route will increase system reliability which will ultimately benefit ratepayers."
2. The U.S. Department of Energy's Office of Emergency Management recognized the need for the line through its post Hurricane Iniki *Hawaiian Islands Hazard Mitigation Report*, prepared for the State of Hawaii and in which it made recommendations to "close the radial transmission loops on Oahu." The Kamoku-Pukela line would comply with this recommendation.
3. The State Department of Business, Economic Development & Tourism, which cited the *Hawaiian Islands Hazard Mitigation Report* recommendation to close Oahu's radial transmission system in its July 23, 1998, *Draft EIS* response letter from its Office of Planning (contained in Appendix N of the September 1999 RDEIS) and indicated that the proposed action would comply with that recommendation.

Providing a new transmission line to connect the Pukela and Kamoku Substations would improve reliability consistent with the findings of these agencies as well as HECCO's standards related to transmission reliability. These standards are also consistent with the Planning Standards of the North American Electric Reliability Council. A non-profit international organization formed in 1968 to promote the reliability of electrical supply for North America.

If the Kamoku substation is developed with a 138-kV link from Kewalo, can power be routed through Kewalo to service areas currently serviced by Pukela?

Yes, at considerable cost and environmental impacts, and without addressing the other needs that the Kamoku-Pukela line would address. The scenario described in your comment above (i.e., all of Pukela loads would be served by the Kamoku Substation) would result in significant added expense and environmental impacts associated with new transmission lines, subtransmission lines, distribution lines, and substation infrastructure. Moreover, by transferring these loads from the Pukela Substation service area to the Kamoku Substation and not building the Kamoku-Pukela line, the time frame for future overload of transmission lines serving the downtown service area would be significantly advanced. This would likely result in the need to build School/Kamoku transmission line at a cost of nearly \$60 million (1997 dollars), and a transmission line between the Halawa and School Street Substations at a cost of nearly \$54 million (1997 dollars) in the near term.

The EIS refers to future loads requirement of the Convention Center, Ala Moana Center, the proposed Kewalo Center, Pawa'a Block, and Victoria Ward developments. When Kamoku is fully developed, will it be possible to provide reliable service to these areas without relying on a new 138-kV line from Pukela to Kamoku, by upgrading the Archer/Kewalo/Kamoku system?

Yes, your suggestion is possible. An upgrade of the Kamoku Substation and its distribution system would solve just one objective: supplying the load growth in the McCully/Moiliili/Waikiki areas that would be served by the Kamoku Substation. But there are other problems to be solved. Developing Kamoku would not solve the fundamental need to close the gap between the northern and southern corridors (which exists between the Kamoku and Pukela Substations) to provide greater transmission system reliability to East

Oahu and Windward Oahu. Another northern corridor line would eventually be necessary to feed Koolau to prevent overloading the existing lines that feed that substation. Developing Kamoku would also advance the future overloading situation on the three southern corridor lines feeding Iwilei and School Street, thereby requiring another southern corridor line to back up the three feeds. The Kamoku-Pukele line would meet all three objectives and problems described above with one transmission line.

HECO did evaluate an alternative that would provide feeds to Kamoku Substation from Archer (via Kewalo Substation) and School Street Substation. However, this alternative assumes that Pukele Substation would still provide service and would, therefore, still require a third line to improve its reliability. In addition, this alternative does not address the need to close the gap between the northern and southern corridors to ensure that power can travel in a clockwise direction (along the northern corridor) to feed substations, or in a counter-clockwise direction (along the southern corridor) to maintain service to the 138-kV/46-kV substations that serve East Oahu and Windward Oahu. Finally, if this alternative assumes that the Kamoku Substation would replace the Pukele Substation, a series of new 46-kV lines would need to be sited and constructed in local neighborhoods to serve those substations that are now fed by the Pukele Substation. This new construction would have environmental impacts on the surrounding neighborhoods, such as construction noise, traffic disruption, and the addition of overhead lines. The overall cost to develop Kamoku Substation as suggested would far exceed the cost for the proposed action and is not considered a reasonable alternative. These alternatives are discussed in Section 3.5 of the RDEIS and in Appendix C.

It is stated that Waikiki will be affected if Pukele fails, but if service can be improved in the Archer/Kewalo/Kamoku system, as stated in the EPS, then risk of overloading in the Waikiki and Ala Moana areas serviced by Pukele can be reduced.

As indicated in the response above, even though Waikiki load growth can be met through substation on the Southern Transmission Corridor, such as the Kewalo or Kamoku Substation, constructing distribution lines to meet this load growth would not close the existing gap in the transmission system between the Northern and Southern Transmission Corridors. Closing this gap is required to maintain the reliability of any substation serving Waikiki. Without constructing the Kamoku-Pukele transmission line as proposed, whenever one of the two existing lines is out for scheduled maintenance, the loss of the remaining line between the Koolau and the Pukele Substations would result in the blackout of urban Honolulu and Waikiki areas served by the Pukele Substation. Overloading of circuits would not be a factor in such an incident.

Is it possible to install two 138-kV lines to Kamoku from Archer and upgrade the distribution system to provide for increased redundancy and more power?

Yes, however, this would provide reliability for only the limited area served by the upgraded Kamoku Substation as compared with the wider area for which the proposed Kamoku-Pukele line would provide reliability. Your suggestion does not address the fundamental need to close the gap between the Northern and Southern corridors, which would improve reliability to Windward Oahu as well as East Oahu, approximately 54 percent of Oahu's customers.

What are the real consequences of not building the new link between Pukele and Kamoku in terms of system reliability, if the Archer/Kewalo/Kamoku grid is upgraded?

The real consequences would be that Windward Oahu and downtown customers would not benefit from the increased reliability that the Kamoku-Pukele line would provide, as described in Section 2 of the RDEIS. This is the result of the potential overloading problems faced by the Koolau Substation, which would be addressed by the proposed action and would not be addressed by upgrading substations downtown. Loss of the Koolau Substation would affect power from Kahuku to Hawaii Kai. Another real consequence would be that the overloading condition in the southern corridor would be accelerated because the northern corridor would not be connected and, therefore, would not relieve that overloading condition. With more power flowing through the downtown substations to feed Waikiki, the forecasted overloading would occur sooner. Without the ability to receive power through the alternative northern corridor, loss of the

downtown substations due to overloading would still leave Waikiki without power. The suggested upgrading of those three substations would not address the need for a third feed to the Pukele Substation and the need to alleviate future overloading problems on the three lines feeding the Koolau Substation.

Based on "actual" loads identified in figure 2-6, it appears that the projected increases are somewhat inflated as actual load growth for Oahu appears to be leveling off rather than steadily climbing as indicated on the graph. Moreover, most of the future load growth for the Oahu system would appear to be in the West Oahu sector where most of Oahu's urban development is occurring. It is difficult to see where significant load growth will occur in the East Oahu areas, as it appears that this area is nearing build-out (except for some downtown areas where redevelopment is related to occur). The view that redundancy must be improved to reduce the risk of future outages due to load growth in this sector, raises questions if projected demand in the East Oahu sector is slower than projected.

This figure was updated in the RDEIS, as Figure 2-9, to reflect actual load through 1998. The projected load increases are not inflated. Because of increased usage within each household, the load in the East Oahu Service Area is predicted to grow at approximately 1 percent per year regardless of whether the Honolulu population increases. Furthermore, even with slower growth, the demand on existing substations will continue to increase based on planned and approved projects in the service area as well as increased usage of electricity by the existing population. For example, there are many projects and developments in East Oahu that have added, or will add, large blocks of load to the service area. These projects include the Honolulu Convention Center, the Ala Moana Shopping Center, the Keaauamo/Sheridan Block (Wal-Mart), and the Victoria Ward Development. When system loads increase to the level where the loads could cause a transmission line to exceed its rated capacity, power outages and permanent damage to the electrical system could occur.

With respect to the uncertainties of load growth, HECO follows the guidelines of the North American Electric Reliability Council (NERC), an international organization focused on coordinating power system reliability in North America. The NERC guidelines state that "transmission capacity must be available on the interconnected transmission systems to provide flexibility to handle the shift in facility loadings caused by the maintenance of generation and transmission equipment, the forced outages of such equipment, and a wide range of other system variable conditions, such as construction delays, higher than expected customer demands, and generating unit fuel shortages." It must be noted that this definition addresses reliability standards for the mainland, which are interconnected systems (that is, transmission systems of different power companies are connected with each other across the states). Because Hawaii does not have an interconnected system, it could be argued that Hawaii standards should be more conservative—that is, provide more redundancy—than NERC standards.

Regardless of growth issues, the new transmission line is needed to improve reliability in the East Oahu Service Area. In particular, the reliability concern facing 18 percent of Oahu customers fed from the Pukele Substation is not dependent on growth in electricity demand. The entire Pukele Service Area is presently at risk whenever one of its two existing 138-kV transmission lines is removed from service for planned maintenance. If the sole remaining line feeding the Pukele Substation is lost for any reason, the entire Pukele Service Area is blacked out. This is not a future reliability concern. By proposing this project, HECO is working to prevent the reoccurrence of blackouts such as the January 1987 (Super Bowl Sunday) outage that affected urban Honolulu and Waikiki. This outage would have been prevented had the proposed Kamoku-Pukele 138-kV transmission line been in place.

These sections (Section 2 and pages 3-63-64) should be re drafted to fully clarify, in lay terms, the ramifications of providing electrical service to the study area with and without the new 138-kV line.

Section 2 of the May 1998 Draft EIS was revised to provide more information on the consequences of constructing or not constructing the proposed project. For example, the reliability Guidelines of NERC are described, data on HECO's system reliability are provided, and decisions and recommendations from public agencies (e.g., PUC, Consumer Advocate) are summarized with respect to reliability and this project. These summaries are written in laymen's terms. Updated information is provided in the September 1999 RDEIS. Some clarifying revisions are made to the discussion of the no-action alternative.

In Section 3, More information on the probable environmental consequences of the no-action alternative is provided in Section 4.

The consequence of not building the project is that the entire Pukela Substation would drop off of the system, resulting in a loss of electricity to 18 percent of the customer load on Oahu, should one of the transmission lines to the substation be down for maintenance and the remaining transmission line fail. This scenario would include a complete blackout of Waikiki. As an example, as stated above, the January 1987 (Super Bowl Sunday) outage to urban Honolulu and Waikiki would have been prevented had the proposed transmission line been in place.

It is suggested that projected demand increases be revisited to determine actual demand growth for the East Oahu area. Projected demand growth for the East Oahu area may be substantially less than growth for other areas of Oahu.

Projections for demand increases are revisited regularly. However, as noted previously, the line is needed even if the load does not increase as forecasted because the primary purpose of the project is to close the gap between the Northern and Southern Transmission Corridors in order to address the existing service reliability concerns at the Pukela Substation. It is also necessary to prevent overloading of existing circuits to the Koolau Substations (primary benefit) and the Wailea, and School Street Substations (secondary benefit), and to provide additional capacity to meet the projected load growth within East Oahu. The load in the East Oahu Service Area is predicted to grow at approximately 1 percent per year regardless of whether the Honolulu population is migrating westward. Even with slower growth, the demand on existing substations will continue to increase because of planned and approved projects in the service area.

HECO has considered conservation and alternative generation facilities like solar to reduce the need for new transmission facilities to help meet their goals of achieving reliability in the system. Did HECO consider the potential contribution of these sources to meeting or staving off future demand and are there actual figures or targets that can be given?

Load projections for the project have factored in the objectives of HECO's Integrated Resource Plan (IRP) and the estimates of existing and planned demand-side management measures. HECO's 20-year, long-range plan, the Integrated Resource Plan (IRP), 1998-2017, combined with a 5-year action plan, is currently under review by the PUC. Energy-efficient DSM programs are major elements in HECO's IRP to meet the future requirements of its customers in a cost-effective manner. Over the next 5 years, HECO's current energy-efficient DSM programs are forecast to reduce the annual growth in demand for additional electricity by approximately ½ to 1 percent. While this dampening can defer overloading issues in a 1- to 5-year time period, eventually demand will grow to a point where the overloading problem will reappear. In addition, the reliability issues facing the Pukela and Kamoku substations are not addressed by relying solely on DSM measures.

Please provide a section discussing the potential rate increase differentials for the average household and business for one or several of the project alternatives. This type of information will help us assess the impact on rate payers so we can consider alternatives.

Estimates of the potential rate impacts for each of the eleven transmission line alternatives (overhead, underground, and combination overhead and underground) are shown for each class of customer in Table 4-12 of the September 1999 RDEIS. For residential customers who use an average of 650 kWh per month, the monthly rate increase for the alternatives ranges from \$0.37 to \$1.00 per month (in 1999 dollars) and \$0.55 per month for the proposed action. For non-residential customers, the increase ranges from several hundred to several thousands of dollars per month. For example, under the proposed action, the estimated monthly increase in the electric bill for the City and County government would be around \$1,000; for the State government it would be around \$23,000, and for the federal government it would be around \$58,000. A customer's potential rate increase would vary according to the electrical usage per month.

The recovery of costs associated with a new transmission line would be recaptured through the HECO rate base. As such, costs of the project would impact residential, commercial, industrial, and government users of electricity on Oahu. The magnitude of this impact would depend upon the overall cost of the proposed

action and the costs determined eligible for recapture by the Public Utilities Commission (PUC). The ultimate impact to the individual ratepayer would be determined through a separate rate case before the PUC only after the project had been completed and was in operation.

The use of photomontage can be an effective land use planning tool but should not be relied on to draw conclusions about the effects of the project on people's viewpoints. The conclusion drawn in the DEIS is that the poles and lines will not cause significant visual impacts from a number of different vantage points in and around the project appears to discount the subjective nature of the issue. While this conclusion was most likely based on the fact that there is an existing 46-kV line on the ridge, the audacity of poles and circuits with significantly different height/width dimensions could have a significant impact on viewpoints.

The photographs should be used in addition to the reasonable opinion of the author about the probable effects of the facility on people in and around the project area. It is our opinion that the system "may" have a significant effect on viewpoints from several different vantage points.

The EIS is prepared because the project may have a significant effect on the environment. The poles and lines are one of the major elements of the project which, we feel, push it into the category of significant. The fact that the effect is significant does not presume that the project will fail but only highlights the importance of this factor for the analysis and decision maker when he/she begins discussing trade-offs - e.g., do the public benefits of the project outweigh the environmental impacts of the project on the present condition of the ridge-line?

Many individuals have expressed the opinion, such as yours, that the visual impact of the proposed action from different vantage points is significant. As discussed earlier in this letter, in reviewing the level of visual impacts associated with the proposed action, the criteria contained in Section 11-200-12, Hawaii Administrative Rules (HAR), were used as a guide. They state that, in most instances, an action shall be determined to have a significant effect on the environment if, "1.(2) Substantially affects scenic views and view planes identified in County or State plans or studies." General views that include Waialae Ridge, from the H-1 Freeway and views from Tantalus toward Diamond Head are identified in a City and County of Honolulu study, *Oahu Urban Design Guide*, prepared in the early 1980's. Based on an analysis of the RDEIS visual simulations from these vantage points, the proposed project would not substantially affect these two views. Nonetheless, the overhead portion of the proposed action and adjustment I would have an adverse impact on visual resources from a number of vantage points and the September 1999 RDEIS summarizes the project's effect on visual resources as a negative impact.

The EIS fully discloses the differences of opinion on whether the overhead portion of the proposed action on Waialae Ridge results in significant adverse visual impacts as required by HAR section 11-200-16. This section states in part, "In order that the public can be fully informed and that the agency can make a sound decision based upon the full range of responsible opinion on environmental effects, a statement shall include responsible opposing views, if any, on significant environmental issues raised by the proposal."

The RDEIS discloses that many individuals have stated the opinion that the potential visual impacts of the proposed action would "involve a substantial degradation of environmental quality" as stated under HAR 11-200-12(2), and thus, would result in a significant adverse visual impact. Given the subjective nature of visual resource assessments ("beauty is in the eye of the beholder") and the rather vague and ambiguous significance criteria outlined in the environmental rules, the visual assessment acknowledges the hundreds of comments received that indicated that the proposed action would have a significant adverse visual impact.

The EIS provides a geographically comprehensive set of visual simulations that view the project from 24 representative vantage points (Key Views) and presents a thorough visual resource assessment upon which conclusions are based. In addition, opposing opinions have been presented such that an agency or decision maker will have information to form an opinion on whether or not the project's visual impacts are significant based on criteria relevant to that particular agency or individual.

The September 1999 RDEIS includes mitigation measures that might minimize the visual impact of the project. Related to poles, mitigation measures might include painting the poles to blend in with the background landscape, planting vegetation in strategic locations to provide a more diverse landscape and

reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridge line. Related to conductors, the primary mitigation measure would be the use of a matte-type finish that would not be reflective in the sunlight and would allow the conductors to blend better with the background vegetation along the ridge line.

HECO realizes, however, that there will still be those individuals who would feel that no amount of mitigation would be able to lower the level of adverse impacts to a point below her/his personal "significance" threshold, and whose only solution would be to not build an overhead line within the existing easements along Waahila Ridge. The only method for completely eliminating the visual impacts of the proposed action along Waahila Ridge, would be to build the line underground through Pablo Valley or elsewhere. However, the PUC stated in its Decision and Order 13201 relating to the Waiau-CIP, Part 2 Transmission Lines that, "Neither of these factors (aesthetics and EMF) however, would justify the underground placement of the transmission lines since aesthetics and as yet inconclusive health effects of EMF do not constitute compelling reasons that would outweigh the added cost of placing the lines underground."

In addition, through Act 133, adopted in 1994, the State Legislature further recognized the need for the PUC to balance the exceptionally high cost of constructing electric utility lines underground with other relevant factors when the PUC exercises its exclusive authority to determine whether it is preferable to construct the electric utility lines overhead or underground. In adopting Act 133, which amended Chapter 269, IIRS, the legislature stated:

While there are benefits to constructing electric utility lines underground, those benefits extend not only to the utilities' ratepayers, whose rates should reflect the utilities' cost of providing reasonably reliable electric service, but extend to the public at large. Ratepayers should not be forced to pay, through their rates, for these additional costs. Accordingly, in the interest of fairness and equity to all ratepayers served by public utilities within the State, those policy-making or implementing bodies that require that electric utility lines be placed underground should provide the funds in excess of those required for overhead construction.

Agencies wishing to implement policies requiring undergrounding of electric lines should bear in mind portions of Chapter 269, 27:6A (2), which indicate that when the PUC makes its decision on whether lines should be placed overhead or underground, it shall consider, "Whether there is a Governmental public policy requiring the electric transmission system to be placed, constructed, erected, or built underground and the governmental agency establishing the policy commits funds for the additional costs of undergrounding."

Section 3.4 conveys the impression that the new system would not create any detrimental impacts to conservation values and presumes that the new system conforms with Conservation District zoning criteria, even though it would result in a much greater intrusion upon conservation values, than presently exists. HECO may wish to reconsider this position since it is rare that we encounter 138-kV transmission lines on prominent ridge lines near populated areas of the State.

The relationship of the proposed action to the goals and objectives of the Conservation District subzones and the BLNR evaluation criteria were discussed in previous response. HECO feels the proposed action complies with these goals and objectives and meets the evaluation criteria set forth by the BLNR.

The DEIS includes a discussion of EMF exposure for each alternative but concluded that research to date has not demonstrated conclusive evidence of health hazards from 138-kV transmission lines similar to those considered for the Kamoku-Pukela project. This remains to be an unresolved matter which lies outside the analytical expertise of the accepting authority. HECO adopted a "prudent avoidance" approach in routing and designing their transmission lines which is disclosed in the DEIS. It will be up to the Department of Health (DOH) and/or the Public Utilities Commission (PUC) to evaluate the adequacy HECO's prudent avoidance strategy.

As discussed in the RDEIS, the Public Utilities Commission (PUC) has adopted the U.S. Environmental Protection Agency's definition of "prudent avoidance" with respect to EMF in Decision and Order No. 13201, Waau-CIP, Part 2 Transmission Line project. In that decision, the PUC concluded that "HECO exercised prudent avoidance" in the routing, proposed design, and operation of that project. Prudent avoidance is an approach to making decisions about risk. When applied to EMF, it means that reasonable, practical, simple, and relatively inexpensive measures are taken to avoid or reduce public exposure to EMF. This approach complies with the State Department of Health's "Policy Relating to Electric and Magnetic Fields from Power-Frequency Sources."

Using the prudent avoidance approach, HECO has proposed placing a portion of the line overhead along Waahila Ridge, so that most of the overhead line is well away from residential areas. In addition, HECO has proposed design measures that would result in a significant decrease in overall magnetic field levels from existing conditions on Waahila Ridge. The addition of the 138-kV transmission line to the existing 46-kV subtransmission lines, and reconfiguration of the poles would result in magnetic field cancellation effects caused by the interaction of the three circuits.

For the solid dielectric cross-linked polyethylene (XLPE) underground line portion of the proposed action in the high-density population area, EMF levels would increase over existing levels and would generally be limited to the public rights-of-way. The portion of the underground line through the University of Hawaii lower campus would use existing access roads. EMF levels would increase slightly outside of the access roads, including in the vicinity of the Hale Ilima dormitory.

We have reviewed this project with respect to its impacts on natural resources and endangered species in particular and offer the following comments. In general, DOEAW opposes any changes beyond what currently exists for Waahila Ridge. Since 1970, we have maintained that powerline easements through State Forest Reserves compromises the existing natural resource values from watershed to recreational uses. There are existing poweline routes along urban intermixed areas that HECO should consider first for their electrical distribution improvements.

As noted earlier in this letter, HECO evaluated 11 alternatives for constructing a 138-kV transmission line between the Kamoku and Pukela Substations. The alternatives were formulated with community input and represented combinations of alignments, configurations, and technologies of overhead and underground lines. The alignments included various roads and rights-of-way between the Kamoku and Pukela Substations. To connect the Kamoku Substation (located at the back of Dole Street and Kamoku Street) with the Pukela Substation (located at the back of Pablo Valley), there are only two general transmission line routes that could be used once the line reached the vicinity of Dole Street/Saint Louis Heights—either streets in Pablo Valley or Waahila Ridge. The configurations included overhead transmission lines, underground transmission lines, and a combination of both overhead and underground transmission lines. The underground technologies included two different types of cable systems: high pressure fluid-filled pipe (HPFF) cable systems and solid dielectric, cross-linked polyethylene (XLPE) cable systems.

In addition to alternatives for constructing a 138-kV transmission line, HECO evaluated other alternatives to address reliability issues for the East Oahu Service Area. These alternatives are more fully discussed in Section 3 and Appendices B and C of the September 1999 RDEIS. In summary, these alternatives included demand conservation alternatives, power generation and storage alternatives, transmission and distribution system alternatives, a no action alternative, and a deferred action alternative.

The following 11 transmission line alternatives were evaluated:

- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-King Street-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-Dole Street-Waahila Ridge overhead alternative

- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE underground alternative
 - Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE underground alternative
 - Kapiolani Boulevard-Palo Alto Avenue XLPE underground alternative
 - Kapiolani Boulevard-Palo Alto Avenue HPFF underground alternative
 - Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFF combination alternative
 - Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE combination alternative
 - Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFF combination alternative
- In an evaluation of the transmission line alternatives described in the September 1999 RDEIS, HEICO determined that the proposed action would be a combination of underground solid dielectric XLPE cable technology and overhead technology over an alignment following Kapiolani Boulevard-Lower Campus and Waahila Ridge. The reasons for this preference were that the Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE combination alternative:
- Is 28 to 51 percent less costly than the viable all-underground alternatives through Palolo Valley and is comparable in cost to the overhead alternatives.
 - Conforms to the preferences of the State Department of Transportation as compared to the University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative) and the Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative:
 - Conforms to the preferences of the University of Hawaii as compared to the University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative).
 - Minimizes public exposure to electric and magnetic fields (EMF) when compared to the lower-cost overhead alternatives.
 - Minimizes visual impacts within the urban area when compared to the lower-cost overhead alternatives.
 - Does not place an overhead transmission line within a high-density population area (which the lower-cost overhead alternatives do).
 - Does not conflict with future rapid transit projects along University Avenue. The University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative) and the University Avenue-King Street-Waahila Ridge overhead alternative would conflict with such projects.
 - Requires fewer easement acquisitions than either the Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFF combination alternative or the Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFF combination alternative.
 - Will not impact known burial sites along Dole Street.
 - Produces fewer environmental impacts to Waahila Ridge than the all-underground Waahila Ridge alternatives.
 - Will have no significant adverse impact on tourism.
 - Will have no significant adverse impact on property values.
 - Is more consistent with the stated positions of the neighborhood boards within the study area than the lower-cost overhead alternatives.

- Mitigates potential impacts associated with possible implementation of Revised Ordinances of Honolulu Section 14-22.1. This section includes a requirement to place overhead utilities underground along certain specific streets, including Kapiolani Boulevard, when such streets are improved according to City requirements.

Overall, the proposed action represents a balanced decision based on existing government regulations, past experience in obtaining government permits and approvals, easement acquisition constraints, community inputs, and cost effectiveness.

A detailed discussion of other alternatives appears elsewhere in this letter. In response to comments on the May 1998 Draft EIS, HEICO investigated the possibility of relocating portions of the alignment along the tower-Waahila Ridge area as a mitigation measure to minimize the extent to which the new poles would change the existing profile view of the ridgeline. HEICO identified and evaluated in the September 1999 RDEIS an adjustment to the proposed action's alignment on lower Waahila Ridge that would situate new poles at lower elevations to the east of the existing 46-kV easement and closer to the existing water tanks to minimize changes to the profile of the lower ridge. This option is referred to as adjustment 1. The proposed action alignment incorporating adjustment 1 would have a total of 18 new steel poles ranging in height from 75 to 113 feet compared to the proposed action's 20 new steel poles ranging in height from 75 to 138 feet. HEICO also identified and evaluated an underground alignment adjustment should technical considerations preclude an underground crossing at the Kapiolani Interchange or within the Old Waahila Avenue Extension Bridge. In this adjusted alignment, the transmission line would continue underground along Kapiolani Boulevard, passing under the elevated portion of the H-1 Freeway near the Market City Shopping Center. The transmission line would then continue along Old Waahila Avenue to the Waialae Gate on the University of Hawaii's Lower Campus. This option is referred to as adjustment 2. The analysis described above for the proposed action also applies to adjustments 1 and 2.

For more information concerning the topic of transmission line technologies as they relate to the proposed Kamoku-Pukela 138-kV Transmission Line Project, please refer to Section 3.0 of the September 1999 RDEIS.

The DEIS describes powerline corridors through native flora and fauna that will be impacted upon by the proposed changes, especially through those areas that intersect the Forest Reserve and State Park. There is insufficient information about the amakihi and other native birds in the area to validate statements made in the DEIS. Studies have only been made recently of the 'elepaio's distribution but we are still investigating its findings to understand their range and life requirements. No other biological information is available to show trends and probable effects & changes occur to their habitats. Yet, we know that the native bird populations will be affected by the permanent modification of their habitat and the resulting maintenance of the utility corridor through the Forest Reserve. More information should be provided on these proposed changes and the impact to flora/fauna.

Regarding your concern on the impact to flora, HEICO does not anticipate an extensive clearing of vegetation on Waahila Ridge during project construction. The transmission line poles for the proposed action would be in the same general area as the existing 46-kV poles. It is expected that vegetation disturbance would be restricted to the areas immediately surrounding each pole. Any such disturbance would be in accordance with HEICO's Integrated Vegetation Management (IVM) program. It is possible that some native vegetation would need to be removed to install the new transmission line poles. However, if practical, the removal of native plants would be avoided. If native plants needed to be trimmed, they would be trimmed to allow re-sprouting. In addition, the IVM program specifies that areas that were cleared would be reseeded—preferably with native species.

No trees are expected to be removed from within the Conservation District, and no large trees would need to be removed as a result of the proposed action. Some ironwood trees near the Pukela Substation will be removed within the project right-of-way because of the existing 16-kV transmission line. Regardless of the proposed action, these trees will be removed. These trees are not within the Conservation District.

The area of ground disturbance for the proposed action and overhead alternatives along Waahila Ridge is approximately 400 square feet per pole (none of the areas in the section on Flora Impacts). The proposed action has 20 poles located in shrub land and/or forest land for approximately 8,000 square feet of disturbance. Adjustment 1 has 18 poles located in shrub land and/or forest land for 7,200 square feet.

All areas of vegetation disturbance on Waahila Ridge would be replanted, preferably with native species. Around Poles Y26 to P13 (lower ridge) and the pole locations of adjustment 1, pili grass seeds would be sown on exposed soil or on pockets of exposed soil between rocks. Pili grass seeds would be collected from plants growing onsite. Golden beardgrass, which forms low, creeping mats, could be planted on exposed soil from Poles P12 to P4. This species makes an excellent ground cover and should be started in a nursery prior to starting construction. Golden beardgrass plugs could then be removed from large trays grown in the nursery for replanting the disturbed areas. 'Olei', which forms a low, woody tang not requiring cutting back, is another good species for replanting disturbed areas. 'Olei' seeds would be collected from onsite and then propagated in the nursery. Disturbed areas around Poles P3 to P1 behind the Pakele Substation, should be replanted with introduced Hilu grass or waehia.

HECO prefers to use native species for its projects whenever practical, and would use native species for the proposed action if it is practical to do so. HECO's IVM program is accepted by the Department of Land and Natural Resources as an appropriate maintenance plan for easements within the Conservation Districts on Oahu. HECO will also make maintenance plans available to the public, should it be required as a condition of a Conservation District Use Permit.

With respect to maintenance, HECO's IVM program specifies that woody vegetation that matures to heights greater than 4 feet within 10 feet of poles and guy wires, and all vines within 10 feet of poles and guy wires, must be controlled or removed. The new poles proposed for this project would be self-supporting and thus would not use guy wires. All herbicides used for maintenance are currently available to the public and are approved by the U.S. Environmental Protection Agency for use in watersheds. Extensive research and experience relative to HECO's selective application of extremely low rates of diluted herbicides within its IVM program have demonstrated that this would result in no harm to the environment or to humans. Within its statement, HECO manages trees and brush (1) that are capable of growing into the conductors (a wires); (2) that obstruct physical or visual access to the lines, poles, or equipment; or (3) that could fall onto lines or equipment. HECO also controls or removes woody vegetation on or along pathways and access roads within the rights-of-way.

A flora survey and report on a pole-by-pole basis were completed in August 1998 to supplement an earlier survey performed in 1993. Section 4.9 of the September 1999 RDEIS summarizes the report and Appendix E of the RDEIS contains the complete report. There were no listed threatened or endangered plant species identified during surveys conducted for the project.

No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed action.

The USFWS maintains a list of species in different hierarchical categories, including "listed plants" (endangered or threatened), "proposed plants," "candidate plants," and "species of concern." The species of concern designation identifies those species that may be endangered or threatened but for which sufficient data on biological vulnerability or threat are not available to support a designation. Plants designated as species of concern are not entitled to federal protection.

Three dwarf koa trees (*Acacia koa'*) were found adjacent to the project's easement. Dwarf koa trees are categorized under the "other species of concern" designation. They are readily available from in-state nurseries for purchase and use in replanting efforts. An additional field survey and analysis were performed for the September 1999 RDEIS to address potential impacts to the dwarf koa trees adjacent to the project's easement. The survey also included the area of adjustment 1, an alignment adjustment to the proposed action on lower Waahila Ridge. (See Section 10-A of the September 1999 RDEIS.) That study concluded that the dwarf koa would not be adversely affected during construction because the trees are located about 50 feet away from the nearest pole construction site. During maintenance of the transmission

line easement, the dwarf koa will only be trimmed with prior consultation and approval from the State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service.

For more information concerning the potential impact of the proposed action and alternatives on flora, please refer to Section 4.9 of the September 1999 RDEIS.

Regarding your concern on the impact to fauna, during the 1993 and 1998 surveys of wildlife, researchers identified no species within the Conservation District near the existing overhead alignment that are listed by the U.S. Fish and Wildlife Service (USFWS) as endangered or threatened species, or that are proposed species for such listings. The Newell's Shearwater is on the USFWS' list of threatened species and this species may occasionally fly over the project site on Waahila Ridge, although there are no known sightings of the bird on Waahila Ridge and no known nesting colonies on Oahu. Existing information available on the Newell's Shearwater recognizes that this species breeds on Kauai and Hawaii, and possibly in extremely small numbers on Oahu and Molokai. Colonies of Newell's Shearwaters have only been found on the Islands of Kauai and Hawaii in modern times. Newell's Shearwaters are extremely vulnerable to predation by terrestrial mammalian predators. Their nesting burrows are quite odoriferous, especially when there are young birds present, which makes it easy for cats, rats, mongooses, and dogs to find them. The primary cause of mortality in Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies. A secondary threat, especially to fledgling birds, is being disoriented by lights on their way to the sea. When disoriented, seabirds often collide with man-made structures and, if not killed outright, the dazed or injured birds are easy targets of opportunity for alien mammalian predators. Collision with utility structures is considered by many to be the second most significant cause of seabird mortality in Hawaii.

Newell's Shearwaters nest high in the mountains in burrows excavated under thick vegetation, such as ohia (*Micromoparia tigris*). There is no record of, nor is there any suitable nesting habitat for, the Newell's Shearwater within the project area and no nesting colonies have been detected to date on Oahu. However, small numbers of this species have been recorded on Oahu following downing incidents. The majority of these downed birds were found on the Honolulu side of the Ko'olau. Thus, it is possible that Newell's shearwaters may occasionally fly over the site. Since the proposed action would include the installation of taller poles and additional wires than the existing 46 kV subtransmission poles and wires, it is assumed that the potential collision risk to transiting Newell's Shearwaters may be remotely increased. It is also noted that pelagic seabirds that return to land after dark are especially at risk of disorientation and consequent downing caused by interaction with unshielded external lighting. However, given the low number of Newell's Shearwaters that frequent the island of Oahu, the increased threat to the overall species survival, if any, will be minimal. In addition, since no lights are proposed in conjunction with the proposed action, there will be no added risk to the species resulting from additional external lighting. Thus, given the current knowledge of the Newell's Shearwater as summarized above, the potential impacts to this species resulting from this project appear extremely low.

In April 2000, the USFWS listed the Oahu 'elepaio as an endangered species under the Federal Endangered Species Act of 1973, as amended ("ESA") (Federal Register, April 18, 2000). In its final rule, the USFWS deemed it prudent to designate Critical Habitat for this species; however, in the rule, the USFWS stated that this task would not be completed until fiscal Year 2004 (Federal Register 2000). There have been four documented sighting of Oahu 'elepaio within 2 kilometers (or about 1.2 miles) of the Pu'ukohola Substation within the last eight years. Two birds were sighted at an elevation of about 1,400 feet above sea level. The northernmost portion of the proposed action is 600 meters (or about 2,000 feet) south of the identified range of this species. It is highly unlikely that an undetected population of Oahu 'elepaio exists within close proximity to the proposed transmission line.

It is recognized that the limited removal of vegetation at each pole site during construction may affect vegetation that the Oahu 'elepaio could potentially use for foraging in the event this species expands its range in the future to include the project area. The Oahu 'elepaio has demonstrated an ability to use a wide variety of foraging techniques and vegetation substrates. However, no habitat essential for the survival of the Oahu 'elepaio was discovered in the vicinity of the project alignment. The vegetation in the project area is extremely dense and is dominated by alien species. There is extensive similar habitat

located contiguous to the project site, and much better habitat is located above the highest point on Waahila Ridge reached by the project. In addition, the existing habitat found within the easement will not change over the long-term from its current managed state under HECo's IVM program. HECo's IVM program could address any potential impacts of vegetation disturbance by the supplemental planning of native species, where biologically appropriate. As a result, any potential for impact to the O'ahu 'elepaio by this project can be considered remote. This recognizes the fact that the species is not known to reside in the project area, that a powerline easement has long existed in the area, that the vegetation present is dominated by alien species, and that the project's impact to the vegetative cover will occur during construction and end following the restoration of the vegetative cover.

Based on the specifics of the proposed project as discussed above, the recent USFWS listing of the O'ahu 'elepaio does not alter the information presented in the RDEIS and its supporting documents. The fact that the USFWS in their final rule deemed it prudent to designate critical habitat should not impact this project.

As previously noted, the vegetation in the project area is very dense and is dominated by alien species. During construction, the proposed project would involve only the minor removal of vegetation in the immediate area of the pole sites that may be used by forest birds in the short-term. With the planned revegetation (preferably with native plant species) of disturbed areas to commence immediately after pole installation, no long-term change to or additional fragmentation of the existing vegetation habitat potentially used by avian/aquatic resources would occur as a result of the proposed action. In the future, present vegetation management practices within the existing easement under HECo's IVM program are anticipated to expand following installation of new poles.

Installation of the proposed 138-kV transmission line above the existing 46-kV subtransmission line within the Conservation District would increase the height of poles and conductors from the ground. During installation of the poles, some birds would retreat from the area. However, it is expected that they would return following completion of the alignment. The possibility that birds or bats might collide with the transmission conductors while in flight is remote.

It is unlikely that the Hawaiian hoary bat (which may be found in the area) would collide with the transmission poles. Bats navigate principally by using highly developed echolocation systems, which are accurate enough for them to locate, pursue, and catch voles in the dark. Therefore, they are uniquely adapted to avoid collisions with manmade obstacles. It is also unlikely that electric and magnetic fields (EMF) would affect bats. An extensive literature review and contacts with wildlife scientists in the islands failed to find any documentation addressing deleterious EMF effects on bats.

The impact of the proposed project on the pueo (owl) would be minimal. Because the poles would extend above the vegetation canopy, there would always be the possibility of collisions. However, the pueo is a diurnal (daytime active) owl, so the likelihood of this occurring would be quite low. The pueo would not be affected by the limited removal of vegetation, the use of herbicides, or EMF.

A survey of invertebrates was conducted in 1999. Land snails (including slugs) were found at all but one of the pole sites surveyed for snails. No listed endangered species (such as the Achatinella spp.) were found in the areas around the existing easement and proposed alignment, including adjustment 1 (an adjustment to the proposed action's alignment on lower Waahila Ridge). Present in the lower Waahila Ridge area is the endemic Hawaiian *Succinea cadiica*, a "species of concern," and two species of endemic Tornatellidae (Achatinellidae). The *Succinea cadiica* occurred at its greatest abundance around the pole nearest to Dole Street and, therefore, disturbance in this area would be addressed.

In the arthropod specimens collected, over 142 species of arthropods were identified, 20 of which (16 percent) are native to the Hawaiian Islands. Alien arthropods were significantly more numerous than native species in all samples, both in numbers of species and individuals. No listed endangered or candidate endangered species was found. A few species apparently new to the Hawaiian Islands were discovered; however, these all appear to be non-native.

Along Waahila Ridge, mobile crane access probably would be available only for poles near to Dole Street (e.g., Pole 726), which is outside of the Conservation District. It is anticipated that all other poles along

Waahila Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter, only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Waahila Ridge area since the *Succinea cadiica*, a species of concern, was found in this area. The biologist will be able to identify the *Succinea cadiica* if it is found and make recommendations to the work crews to minimize disturbances. Overall, the majority of the invertebrates recorded are not native to the Hawaiian Islands. However, some native and endemic species were recorded during the survey and, although not formally listed as endangered, they should be treated with care. Ongoing vegetation management would not differ from current practice and, therefore, there are unlikely to be any major impacts from future vegetation management while the proposed new line is in operation.

For more information concerning the potential impact of the proposed action and alternatives on fauna, please refer to Section 4.10 of the September 1999 RDEIS.

In locations where underground placement of powerlines are unavoidable and where new poles replace existing poles, every effort should be made to use "Best Management Practices" to minimize the effects of erosion to the Ala Wai watershed area. A mitigation plan to prevent wildlife during construction is recommended. This should be explained further in Section 4.18 of the DEIS under Public Safety and Service, because the manka portion of the proposed powerline corridor meanders through old growth dry native/introduced vegetation that abuts residential neighborhoods and recreation areas

Various sections of the RDEIS have been revised to reflect the following general information.

With respect to the erosion potential associated with construction of the overhead portion of the proposed transmission line along Waahila Ridge, excavation for the poles would require minimal soil disturbance and would be limited to the area immediately surrounding each individual pole. Since the surface disturbance from siting transmission poles would be minimal, it would not significantly decrease soil absorption or increase the amount of surface runoff. There would be no permanent changes in absorption rates, drainage, or surface runoff. HECo would employ best engineering practices (BEPs) to prevent soil erosion during the construction phase of the project. These BEPs could include the use of portable dikes or sandbags upstream of the disturbed area around each pole to deflect runoff away from bare soil areas. Silt fences could be placed downstream from each disturbed area to retain any sediment that did run off from disturbed areas. Given the distance of both Manoa (except by Dole Street) and Palolo Streams from the overhead portion of the proposed project along Waahila Ridge, the existence of intervening roadways and other barriers, or the use of BEPs to contain erosion, it is highly unlikely that siltation of either stream as a result of construction activities along Waahila Ridge could occur.

For the underground section of the project in the urban areas, no trenching within existing stream channels or stream alterations would occur. However, there is a high water table in the urbanized portion of the project and dewatering activities would be required during construction of the underground line in this area. With dewatering activities, water removed from the construction area could be either (1) stored in a holding tank and then taken away for disposal on an open field site or (2) pumped into an adjacent trench to allow for natural filtration back into the water table. With either of these measures, the sediment-bearing effluent from dewatering would not be placed into storm drains that are connected to nearby streams or to the Ala Wai Canal.

The City and County of Honolulu's National Pollution Discharge Elimination System permitting process and the State Department of Health regulate dewatering activities that use storm drains to dispose of construction-related dewatering effluent. Effluent from dewatering efforts must be diverted to settling and holding tanks or pits before it can be disposed through the storm drainage system. HECo does not intend to use techniques that would require disposal of dewatering effluent in the storm drains. Therefore, it is not anticipated that construction activities related to underground trenching would create siltation impacts within the local streams or the Ala Wai Canal.

Herbicides would be used along the existing right-of-way to control vegetation. Herbicide activities in connection with the proposed project would not differ from activities that currently occur within the right-of-way for the existing 46-kV transmission line. The herbicides that are applied are in a very dilute form. If it rains within a few days of the application of herbicides, the herbicides become even more dilute and bind to the soil. It is not expected that the water quality of the nearby streams would be affected. The herbicides currently used by HEICO are applied at low rates in a manner that allows them to rapidly biodegrade into naturally occurring compounds in the soil. These herbicides have been demonstrated to have no significant mobility through soil. HEICO recently completed an environmental fate and mobility study of herbicides use on rights-of-way in cooperation with the Honolulu Board of Water Supply, Hawaii Department of Agriculture, Hawaii Department of Health and University of Hawaii. The results of this local study support the conclusion that HEICO's use of herbicides does not pose a foreseeable risk to groundwater. In addition, the herbicides used by HEICO are approved by the U.S. Environmental Protection Agency for specific use along stream banks and within watershed areas. Thus, these herbicides pose no foreseeable threat to surface water or groundwater.

The proposed action is not anticipated to impact water resources of the Ala Wai Canal Watershed Improvement Project. Water quality within Manoa and Palolo Streams is not affected by the Pukela Substation and the existing 115-kV line and the proposed 138-kV line for several reasons.

- HEICO does not perform clearcuts within its rights-of-way
- The herbicides HEICO uses are applied at low rates in a manner that allows them to rapidly biodegrade into naturally occurring compounds, and, since they are shown to have no significant mobility through soil, the herbicides pose no foreseeable risk to groundwater
- The herbicides that are used are approved by the U.S. Environmental Protection Agency for use within watershed areas and along stream banks
- HEICO's Integrated Vegetation Management program specifies that protective buffers be established around surface water bodies, drinking water wells, and reservoirs, with the size of the buffer zone dependent on the specific site conditions
- Fluids spilled from HEICO machinery are cleaned up and do not reach water bodies

Although there may have been instances in the past of fire associated with fallen electrical wires, HEICO is not able to locate in its records any references to such incidences caused by a fallen 138-kV overhead transmission line and believes the likelihood of such an incidence is extremely remote. Accordingly, there does not appear to be any increased risk of brush fires associated with the proposed new 138-kV transmission line on Waahila Ridge beyond any remote risk that may presently exist. In fact, the strengthened design and construction of the proposed new transmission line and use of steel poles may act to reduce the risk of fire associated with downed powerlines on Waahila Ridge. Although highly remote, it is possible that sparks from a downed line could contact tree branches during a severe storm. However, because of sophisticated relay and protection equipment on HEICO's transmission system, the line would be de-energized within a fraction of a second if a fault occurs. To further reduce this risk, fire prevention activities that currently are performed by HEICO as part of its Integrated Vegetation Management (IVM) program would continue. These activities include the trimming and/or removal of vegetation that could contact or fall into the overhead transmission lines and the appropriate disposal of slash and logs. The Honolulu Fire Department would be able to access the area within the right-of-way in the same manner as it currently does. As part of the project's permitting process, HEICO will prepare a fire prevention plan.

Nine of twelve alternatives cross through Waahila State Recreation Area. In the vicinity of the Waahila State Recreation Area, the powerline would be placed on poles ranging in height from 80 feet to 114 feet, and would occupy the same location as the existing Pukela 46-kV subtransmission lines.

Since issuance of the May 1998 Draft EIS, pole heights in the Waahila State Recreational Area were revised based on field survey data obtained in 1999. The September 1999 REEIS Figure 3-1 shows the

location of poles in the recreational area, and Table 3-1 indicates their heights. These heights are expressed as a range, within which actual pole heights would be designed based on detailed surveying and engineering. Poles in the recreational area include Pole P4 (H-frame structure marks the park along the ridge trail), whose height would range from 75 to 86 feet, and Poles P5, P6, P7, P8, P9 and P10, whose heights would range from 82 to 110 feet.

Waahila State Recreation Area is an exceptional recreational area for its cool, quite, forest environment - one of a very few, accessible mountain recreation areas adjacent to urban Honolulu. Potential project impact to the State Recreation Area is a primary concern for the Division of State Parks.

In commenting on the EA, State Parks asked that visual impacts to scenic views from the park be addressed and that before-and-after graphics be provided. Is the DEIS does address the impact of the project on scenic views from the park as well as views from within the park. The analysis includes before and after photo/graphics. State Parks noted that the existing dirt road accessing the State land marks of the park begins at the parking lot in the middle of the developed portion of the park. The Transportation section of the EA identifies some on the transportation needs for project construction, but did not indicate how these needs were to be met, also noted was the fact that heavy equipment operations in the park could have a significant impact on park facilities and park use.

While there is no additional information in the Transportation Section, in the current DEIS, on page 3-38, it is stated that "existing access to the Conservation District is limited to a small road through the Waahila State Recreation Area and various hiking trails".

While the DEIS does indicate that trails will be impacted at the point where the powerline crosses the trail, please include a discussion of the project construction impacts, if any on the State Recreation Area access road, the parking and picnic areas and the dirt roads and hiking trails. Is HEICO proposing to use heavy equipment on park roads and trails to gain access to the construction sites? If a portion of the State Recreation Area is to be used, what construction activities would occur and how long would these activities continue? How will park users be affected? Please provide a detailed discussion with mitigation measures if this is the case.

Construction of the overhead transmission line would begin with surveying, establishing access, and creating construction staging areas. Construction of the proposed action, including the overhead and underground portions, is expected to last about 18 months. Construction would begin as soon as approvals were received.

Because of the inexcusable nature of most of the poles in the Conservation District, foundations would need to be dug by hand, which would require the use of jack hammers. However, if existing access roads are wide enough to permit vehicular access and risk of vegetation disturbance is minimal, portable drilling equipment might be considered. The poles would have pier foundations with diameters ranging from 5 to 7 feet and depths ranging from 15 to 30 feet. These foundations would be embedded in the rocky ground conditions. Usually, two to three foundations at a time would be excavated, formed, and poured, which would require 2 to 3 weeks to complete. Approximately 27 to 34 cubic yards of soil would be excavated from each pole hole. During installation of the new steel poles, temporary wooden poles would be installed to support the existing 46-kV lines (de-energized as needed) while the existing wooden poles were removed.

After each foundation anchor and pole has been erected, topsoil would be replaced. Excess soil would be removed from the site via helicopter. Once the hole has been dug, the rebar cage, anchor bolt cage, and concrete would have to be flown in by helicopter. After the foundation has set, steel pole erection, framing, and line-stringing operations would begin. Upon completion, the site would be restored to its pre-construction condition. This would be accomplished by preserving the existing low-growing vegetation within the easement in order to inhibit invasion of undesirable vegetation, protect against erosion, and maintain an aesthetically attractive environment.

Areas with no existing access roads would be accessed by foot or helicopter. Possible construction staging area sites have not been identified, but would be located near the general vicinity of the project site on both

the Honolulu and Windward sides of the Koolau Mountains. In general, HECCO would select sites located away from residential areas to reduce any adverse impacts from equipment handling and helicopter operations. There would be no staging areas within the Conservation District. The recreational area would not be used for construction materials storage or construction parking, although materials used at a pole site may be stored for several days while work is being performed at that pole site.

Except for some temporary restrictions to access while constructing poles adjacent to trails or in the Waahila Ridge State Recreational Area, no adverse impact to the park or hiking trails would occur. Hiking and mountain biking trails in the vicinity of the existing HECCO easement sometimes follow and/or cross the easement for short distances and at other times parallel the easement a small distance away. For safety reasons during construction, parts of the trail on the ridge that are close to pole sites might be closed or temporary detours might be established for a few weeks at a time. For the existing H-frame structure in the Waahila Ridge State Recreational Area, access through the area of construction would be restricted for safety reasons during the construction period. The Waahila Ridge State Recreation Area consists of approximately 50.5 acres and contains 5 concrete picnic tables, 3 sheltered picnic areas, and 19 parking stalls. Additional observations identified 4 water fountains, 9 disposal units, 3 grill units, and 1 comfort station. None of these amenities would be adversely impacted by the proposed action. Adequate notice would be given to the public before work was to be done in the park or on Waahila Ridge.

In the long-term, the new steel poles would actually be less prone to falling because they are designed to withstand higher wind speeds. This would also reduce the risk of the conductors and insulators falling. Existing maintenance and helicopter use in the area would continue. The overall magnetic field levels within the park and trails would decrease as a result of the proposed action. All herbicides are commonly available to the public and are approved by the U.S. Environmental Protection Agency for use in recreational areas. Extensive research and experience relative to HECCO's selective application of extremely low rates of diluted herbicides within its integrated vegetation management program has demonstrated that this would result in no harm to the environment or to humans.

The efforts associated with easement maintenance have been recognized by the director of HECCO's program to actually increase the attraction of the area for mountain bike riders and hikers. However, the use of the HECCO easements by mountain bikers is not compatible with HECCO's overall vegetation management program, which attempts to control erosion through the encouragement of native species growth. Mountain biking activities tend to destroy low-growing vegetation and increase erosion potential.

At the park's viewpoint into Manoa Valley and at some locations on the trails, the poles and conductors would be visible and would increase the negative visual effect caused by the existing poles and conductors. At other locations, the poles and conductors would not be seen. The visual impact would diminish the enjoyment of some users of Waahila Ridge's recreational opportunities. HECCO will implement mitigation measures to attempt to reduce the visual impacts. Related to poles, mitigation measures might include painting the poles to blend in with the background landscape, planning vegetation in strategic locations to provide a more diverse landscape and reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridgeline. Related to conductors, the primary mitigation measure would be the use of a male-type finish that would not be reflective in the sunlight and would allow the conductors to blend better with the background vegetation along the ridgeline.

No long-term operational noise of consequence is anticipated from any of the overhead alternatives, including the proposed action. During corona activity, transmission lines (primarily 34.5-kV and above) generate a small amount of audible noise. (Corona is the physical manifestation of energy loss. Energy can be transformed into very small amounts of light, sound, radio noise, chemical reaction, and heat.) Audible noise decreases with distance from the transmission line. This audible noise can rarely be heard in fair conditions on the higher voltage transmission lines and is normally not heard at all on 136-kV transmission lines, even in quiet areas. During wet weather, water drops collect on the conductor (wire) and increase corona activity so that a crackling (or buzzing) sound may be heard near the transmission line. The noise is caused by small electrical discharges from the water drops.

It is also possible for a humming noise to be produced by wind flowing past conductors under high wind conditions. However, the addition of three conductors and a shield wire is anticipated to have an insignificant impact on existing noise levels potentially produced during high wind conditions because the placement of the proposed action will be located within in the same terrain and have the same orientation relative to wind patterns as the existing subtransmission line alignment.

Noise levels associated with proposed project maintenance are not expected to change from noise levels associated with maintenance of the existing 46-kV subtransmission line on Waahila Ridge because the maintenance procedures are the same. The public would be notified before helicopter work would commence. During project operation and maintenance, helicopters would be used quarterly to inspect and maintain the transmission lines in inaccessible areas. In addition, they would be used to transport vegetation management crews to areas that are inaccessible by vehicle. Helicopters would drop off crews and their equipment at the beginning of the workday and pick them up at the end of the day. These disturbances would generally be intermittent and of short duration.

Maintenance of Vegetation within the Right of Way: In our comments on the EA, we asked that ongoing maintenance of the vegetation associated with the easements be addressed.

Maintenance of vegetation with the right of way is addressed on pages 3-4/3-44. This section indicated that maintenance is accomplished using either hand cutting (using chain saw and brush saws), mowing, and application of dilute herbicide solutions to undesirable vegetation when necessary, or a combination of these alternatives.

During the construction of either an overhead or underground segment, care would be taken to preserve as much of the existing ground cover as practical. Low-growing, native vegetation would be preserved and encouraged within the easement to inhibit invasion of undesirable vegetation, protect against erosion, and maintain an aesthetically attractive environment. Native plants would be avoided during construction to the extent practicable. The native plants to be preserved, such as the ko'a'i, a species of concern, would be marked with flagging prior to construction. No large trees would be removed as part of the construction, though some may need to be trimmed along the underground segment. A qualified botanist would work with the design team during final design to identify native plants to be avoided and designate specific, appropriate trimming techniques should trimming be required.

In most instances, crews would perform clearing by hand, using chain- and brush-saws under the supervision of a qualified botanist. Heavy equipment would be restricted from steep slopes where light vegetative ground cover or soil types create unreasonable erosion potential. Freshly cut stumps of undesirable vegetation would be selectively treated with a dilute herbicide solution to inhibit regrowth. This selective control would permit desirable, low-growing vegetation to be quickly established on the site, thus minimizing erosion and adverse visual impacts.

Logs, large limbs, and brush from the clearing operation would be bucked (cut into manageable lengths) and scattered on the site during construction of an underground alignment over Waahila Ridge. Logs would be cut into variable lengths so that they would lie as close to the ground as possible and would be stacked along the edge of the right-of-way so as not to obstruct access. On steep slopes, where erosion is a hazard, logs and brush could be left perpendicular to the slope to redistribute surface water flow and minimize erosion. Should an underground alignment over Waahila Ridge be chosen, it would follow a new easement. Therefore, a detailed botanical survey would need to be performed to verify the absence of protected or unique species.

All areas of vegetation disturbance on Waahila Ridge would be replanted, preferably with native species. Around Poles P26 to P13 (flower ridge) and the pole locations of adjustment 1, pili grass seeds would be sown on exposed soil or on pockets of exposed soil between rocks. Pili grass seeds would be collected from plants growing onsite. Golden beardgrass, which forms low, creeping mats, could be planted on exposed soil from Poles P12 to P4. This species makes an excellent ground cover and should be started in a nursery prior to starting construction. Golden beardgrass plug could then be removed from large trays grown in the nursery for replanting the disturbed areas. 'Ilei, which forms a low, woody tangle not requiring cutting

back, is another good species for replanting disturbed areas. 'Olei seeds would be collected from onsite and then propagated in the nursery. Disturbed areas around Poles P3 to P1 behind the Pu'ele Substation, should be replanted with introduced Hilo grass or wedelia.

We are concerned about the impact the proposed overhead routing on the Honolulu Fire Department's (HFD) ability to control brush fires that occasionally occur on Waahila Ridge. In the past, HFD has used helicopter-borne water buckets to fight these fires. If the high steel poles and suspended powerlines serve to impede such efforts, the risk of brush fires could increase, resulting in the removal of ground cover and the subsequent increase in sedimentation in both Manoa and Paolo watersheds.

During operation of the proposed action, fire prevention activities that currently are performed by HFCO as part of its IVM program would continue, and the Honolulu Fire Department would be able to access the area within the right-of-way in the same manner as it currently does. The Honolulu Fire Department, in its comment letters of June 23, 1998 and November 12, 1999, did not express concern about firefighting capability on the ridge with respect to the proposed action.

Regardless of the alignment or routing method, (overhead/underground) selected, the applicant should take appropriate measures during construction to minimize erosion and silt runoff to the greatest extent possible. Please see the response above concerning best engineering practices as they relate to erosion and surface runoff.

Thank you for taking the time to review the September 1999 RDEIS. Included with this letter is an enclosure showing substantive verbatim changes made to the text of the September 1999 RDEIS and included in the RFEIS. New text in the RFEIS is underlined and text deleted from the RDEIS is crossed out. In the enclosure, the term "EIS" refers to the RFEIS (including all of its appendices in separate volumes).

Please feel free to contact me if you have further questions or comments regarding this project. If you would like to secure your own copy of the RFEIS, please request it in writing and direct your request to me at the address listed at the top of the first page of this letter. The overall organization of the RDEIS and RFEIS and the general contents of the volumes (3-ring binders) are indicated in an enclosure to this letter. Because of the size of the RFEIS, please allow five to ten working days for the processing and mailing of your request.

Again, thank you for your comments.

Sincerely,

CH2M HILL

Paul Luerssen, AICP
Senior Project Manager

cc: State of Hawaii Department of Land and Natural Resources, Land Division
State of Hawaii Office of Environmental Quality Control
Hawaiian Electric Company, Inc.

Nov 1 / 11/99
10/29/99
Hopefully, we'll
have their element
obj. issued.
Oahu

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Planning Branch
Honolulu, Hawaii

OCT 26 1999

SUSPENSE DATE: 21 Days

MEMORANDUM

TO: Aquatic Resources, Oahu District Land Agent, Forestry and Wildlife, Historic Preservation, Commission on Water Resources Management, Engineering Branch, State Parks

FROM: Dean Uchida, Administrator/Land Division

SUBJECT: REQUEST FOR COMMENTS Revised Draft Environmental Impact Statement for the Kamoku-Pukele 138kV Transmission Line Project, Waahila Ridge, Honolulu, Hawaii

APPLICANT: Hawaii Electric Company Inc.

AGENT: CH2MHILL

TMK: Various

LOCATION: Waahila Ridge/Honolulu, Hawaii

PUBLIC HEARING: YES NO

Copies of the revised DEIS or located in the Land Division Office. Please contact Sam Lembo at 587-0381, to obtain a copy of the document or should you have any questions on this matter.

If no request for the document is made or no response is received by the suspense date, we will assume there are no comments. The suspense date starts from the date stamp.

Attachment(s)

10/29/99

CH2MHILL
1515 Kapiolani Blvd
Suite 1420
Honolulu, HI
96814-4530
Tel 808.943.1133
Fax 808.941.3225

The following are specific concerns that I have, which I hope can eventually be incorporated into conditions for the conservation district use permit and/or other permits.

1. Please confirm the minimum distance the powerlines will be from any St. Louis Heights residence for both alternative #1 and alternative #5.
2. Please confirm the maximum increase in EMF levels, for any St. Louis Heights Home, expected with both alternative #1 and alternative #5.
3. Will HEFCO publish a monthly construction newsletter and what information would the newsletter contain? I hope, at a minimum, that HEFCO would notify St. Louis residents of construction progress, work to be done over the next six weeks, and the overall project schedule.
4. Will HEFCO do everything possible (if an overhead alignment is ultimately chosen) to minimize visual impacts by making the utility poles as low as possible, while not posing a threat to public safety?
5. Will HEFCO continue its policy of no aerial application of herbicides?
6. Will HEFCO use passive methods of vegetation control such as planting grasses or other types of ground cover to control vegetation? What methods of maintenance has HEFCO used to maintain the existing 46-kV line easement? How would maintenance programs be adjusted with both alternative #1 and alternative #5?
7. What are the projections on costs to consumers. Please utilize a rate impact table similar to table 4-11, but instead of using useful life of project assumptions, in relation to the planned method of financing and expected cost recovery.
8. What type of contingency fund will HEFCO establish to deal with community concerns as they arise during the construction phase?
9. Who would residents contact at HEFCO if they have concerns during the construction phase?

Thank you for this opportunity to comment and ask questions on the project, and for your thorough responses to these concerns.

Very truly yours,
Calvin K.Y. Say
Calvin K.Y. Say
Representative, District 18

- CH2MHILL
1515 Kapiolani Blvd
Suite 1420
Honolulu, HI
96814-4530
Tel 808.943.1133
Fax 808.941.3225
- December 7, 1998
- Rep. Calvin K. Y. Say
Representative, District 18
House of Representatives
State of Hawaii
State Capitol
Honolulu, HI 96813
- Subject: Hawaiian Electric Company, Kamoku-Pukela 138-kV Transmission Line Project Draft Environmental Impact Statement Comments
- Dear Representative Say:
- Thank you for your letter concerning the Kamoku-Pukela 138-kV Transmission Line Project Draft Environmental Impact Statement (EIS). Our responses to your individual comments follow:
1. *I am aware that there is some concern about EMFs on St. Louis Heights. HEFCO has informed me that the new lines will be no closer than 300 feet to any St. Louis Heights homes, and thus there will be no measurable increases in EMFs for any homes on St. Louis Heights.*

That is correct. As shown in Figures 4-39 to 4-49 of the Draft EIS, no increases in magnetic field levels would occur at any residential property boundaries on St. Louis Heights as a result of any of the alternatives analyzed.

2. *Please confirm the minimum distance the powerlines will be from any St. Louis residence for both Alternative #1 and Alternative #5.*

The closest the proposed action (Alternative 1—Kapiolani Boulevard-Lower Campus-Waahila Ridge Combination Alternative) comes to private property and the boundaries of the St. Louis neighborhood is approximately 840 feet, as shown in Figure 3-1 of the Draft EIS. Alternative 5—Kapiolani Boulevard-Lower Campus Waahila Ridge Solid Dielectric, Cross-linked Polyethylene (XLPE) Underground Alternative—which is not being proposed, comes within approximately 300 feet of the St. Louis neighborhood.

3. *Please confirm the maximum increase in EMF levels for any St. Louis Heights home expected with both Alternative #1 and Alternative #5.*
- As shown in Figures 4-39 to 4-49 of the Draft EIS, no increases in magnetic field levels would occur at any residential property boundaries on St. Louis Heights as a result of any of the alternatives analyzed.

Mr. Kerstan Wong, HEFCO
Mr. Michael Wilson, DLNR

Representative Calvin K. V. Say
Page 3
December 7, 1998

4. Will HE CO publish a monthly construction newsletter and what information would the newsletter contain? I hope, at a minimum, that HE CO would notify area residents of construction progress, work to be done over the next six weeks, and the overall project schedule.

HECO would work closely with the community to keep them abreast of the construction schedule and progress of the proposed project. Publishing a newsletter is one means of communication that will be considered.

5. Would HE CO do everything possible (if an overhead alignment is ultimately chosen) to minimize visual impacts by making the utility poles as low as possible, while not posing a threat to public safety?

If the overhead alignment is ultimately selected as the preferred route, final design of the utility poles and lines would be prepared to minimize the visual impacts by making the utility poles as low as possible while maintaining the required safety code ground clearances and line separations.

6. Will HE CO continue its policy of no aerial application of herbicides?

Yes. When herbicides are used, they are applied by trained personnel using hand-held, ground-based equipment and are applied directly to vegetation pursuant to HE CO's IVM program. HE CO's philosophy is not to eradicate all vegetation species within the right-of-way (which could occur with aerial spraying), but, rather, to target the undesirable invasive species while encouraging the growth of desirable native species. The herbicides used by HE CO are approved by the U.S. Environmental Protection Agency specifically for use within watershed areas and along stream banks.

7. Will HE CO use passive methods of vegetation control such as planting & grasses or other types of ground cover to control vegetation? What methods of maintenance has HE CO used to maintain the existing 46-kV line envelope? How would maintenance programs be adjusted with both Alternative #1 and Alternative #2?

HECO's IVM program includes cultural control (cultivating desirable vegetation or livestock grazing), manual or mechanical control (cutting, mowing, danger tree trimming/removal, and selective trimming), biological control (using natural agents to manage vegetation), or chemical control (selective use of dilute herbicide solutions on target vegetation or cut stumps).

HECO's primary method for vegetation management is biological control, in which undesirable invasive species are identified for control and the growth of desirable low-growing native species is encouraged. To accomplish this, HE CO currently manages vegetation within the 46-kV easement through manual cutting, cut stump treatment, and selective foliar application (herbicide use). Implementation of the proposed action would result in no change to the existing vegetation management practices that occur within the 46-kV transmission line within the right-of-way.

If an all-underground alternative over Waiala Ridge were to be implemented, a 50-foot strip of land would be cleared in order to eliminate vegetation root systems, a necessary practice for maintaining the underground transmission line. The end result would be a strip of land that would be maintained in grass or some other low-growing vegetation. This would create a dramatic difference in the landscape from what is presently there.

8. What are the projections on cost to consumers? Please utilize a rate impact table similar to Table 4-11, but instead of using useful life of project assumptions, (create a table) in relation to the planned method of financing and expected cost recovery.

The numbers shown in Table 4-11 of the Draft EIS were developed using HE CO's planned method of financing and expected cost recovery. Rates are established by the PUC in rate cases, which are based on total company costs and total kilowatt-hours of electricity sold.

9. What type of contingency fund will HE CO establish to deal with community concerns as they arise during the construction phase?

HECO generally establishes contingency funds within its construction budget to address unforeseen problems. The specific mechanisms and amounts have not been established at this time and would be considered during the preconstruction planning phase of this project.

10. Who would residents contact at HE CO if they have concerns during the construction phase?
- The HE CO point of contact during the construction phase has not yet been determined. A contact person will be identified and her/his name communicated to the community as we near the construction phase.
- Thank you for taking the time to review the Draft EIS. Please feel free to contact me if you have further questions or comments regarding this project. If you would like to secure your own copy of the Final EIS, please request it in writing. Please direct your request to me at the address above. Again, thank you for your comments.

Sincerely,

CHEN HUANG



Mark R. Willey
Project Manager

cc: Kerrian Wong, HE CO
Sam Lenano, DLNR
Gary Gill, OEQC

The RDEIS states that the preferred Kapiolani-Lower Campus-Waahila Ridge alternative, with its combination of underground technology transitioning to an overhead transmission line through the Conservation District is the most reasonable cost alternative (p. 5-2). However, not all costs can readily be measured in dollars and cents, and the least costly solution is not always the best.

Given the context of this comment under your letter's section heading, "Kapiolani Boulevard-Palo Alto Avenue HPFP or XLPE Underground Alternative" and the subsequent discussion, you have questions about HEFCO's decision to not select an all-underground alternative. As described in the September 1999 RDEIS, HEFCO selected the proposed action from among 11 transmission line alternatives because it represents the best balance among the various environmental, social, economic, and engineering concerns, as well as meeting the project's objectives. The following discussion outlines the major reasons for not selecting an all-underground alternative.

Over the past several years, government decisions on requests to construct transmission lines in the State of Hawaii have defined circumstances in which it would be appropriate to place lines underground and have described how to pay for the underground technology. For an application by Hawaiian Electric Light Company (HELCO) to install two overhead 69-kV transmission lines in Puna, the Public Utilities Commission (PUC) stated in its Decision and Order No. 10620:

...the cost of placing transmission lines underground is very high and the burden of that cost ultimately falls upon the ratepayer. Thus, unless (1) there is a compelling reason (which outweighs the cost) to place the lines underground or (2) there is a stated public policy requiring the lines to be laid underground or (3) the ratepayers as a whole consent to bear the high cost of putting the lines underground, we do not believe that we should require HEFCO to place the transmission lines underground.

With respect to the first circumstance (that is, a compelling reason), the PUC decided that obstruction of a view plane is not sufficient cause to require ratepayers to bear the additional cost of underground utility lines.

Previously, in HEFCO's application for the Waiai-CIP Part 2 Transmission Lines, the PUC recognized that the project would cause visual impacts and public exposure to EMF. However, after lengthy testimony and deliberation, the PUC concluded in its Decision and Order No. 1320:

Neither of these factors (esthetics and EMFs), however, would justify the underground placement of the transmission lines since aesthetics and as yet inconclusive health effects of EMF do not constitute compelling reasons that would outweigh the added cost of placing the lines underground.

With respect to the second circumstance (stated public policy), HEFCO has requested, and the PUC has approved, underground transmission lines where public policy requires the placement of transmission lines underground (such as the School Street-Archer Transmission Line, which passes through the Capitol Special District).

For the third circumstance (such as ratepayer consent), the PUC must determine whether ratepayers as a whole (residential, commercial, institutional) would consent to pay the higher cost of underground transmission lines. This question will be resolved when the PUC considers HEFCO's application, the evaluation factors in Hawaii Revised Statutes (HRS) Section 269-27.6, and other criteria the PUC deems relevant for this project.

HECO has identified, through years of operation, additional circumstances in which it would place transmission lines underground. These additional circumstances include:

(4) The requester for underground transmission lines pays for the cost differential (including engineering, materials, and construction) between an overhead and an underground system.

(5) For engineering and operating reasons, HEFCO cannot construct an overhead transmission line.

(6) The installed cost for an underground system is comparable to the cost of an overhead line. For the fourth circumstance, the ratepayers, as a whole, do not bear the burden of the higher cost of installing underground transmission lines. In the fifth circumstance, overhead lines cannot properly function in an area and, therefore, an underground technology is the only reasonable technology to address the need. For the sixth circumstance, the costs are comparable, so an underground line could be proposed without creating undue cost burdens on the ratepayer. (For more information on the issue of the placement of underground lines, please refer to Section 6.6 of the September 1999 RDEIS.)

When comparing the Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE combination alternative with the two all-underground alternatives, through Palo Alto Valley (the Kapiolani Boulevard-Palo Alto Avenue XLPE and HPFP alternatives), the following observations were made:

- Present value costs for the Palo Alto Avenue alternatives are \$39.3 million (XLPE) and \$46.4 million (HPFP)—approximately \$8.6 million (28 percent) and \$15.7 million (51 percent) more than the proposed action, respectively.
- In the case of the Palo Alto Avenue XLPE alternative, public exposure to EMF would be increased when compared to overhead transmission lines along the unpopulated Waahila Ridge.
- The Palo Alto Avenue alternatives would cause greater disruption to the general public during construction.
- Repair and maintenance of the Palo Alto Avenue alternatives would be somewhat more difficult than for the preferred XLPE combination alternative.
- No clear public consensus, as reflected in the neighborhood board resolutions, supports the Palo Alto Avenue alternatives over others.
- The Palo Alto Avenue alternatives would not have visual impacts on Waahila Ridge.
- The Palo Alto Avenue alternatives would not contain segments within the Conservation District.
- The Palo Alto Avenue alternatives do not affect the profile view from Mana Valley of Kauihi the Sleeping Giant—a potential traditional cultural property associated with Waahila Ridge.

HECO recognizes the advantages of the all-underground alignments regarding visual impact mitigation. However, the 28- to 51-percent higher costs associated with all-underground alignments do not justify their selection over viable lower-cost alternatives to satisfy primarily visual mitigation given that two 46-kV substation transmission lines already exist along the Waahila Ridge alignment. Therefore, the underground alternatives through Palo Alto Avenue are not preferred over the Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE combination alternative. However, the Kapiolani Boulevard-Palo Alto Avenue underground alternatives are still viable alternatives and may be pursued in the event that the proposed action does not receive the necessary approvals.

Undergrounding is clearly supported by the following policies in the City's General Plan:

Natural Environment

Objective A, Policy 1: Protect Oahu's natural environment, especially the shoreline, valleys, and ridges, from incompatible development.

Objective B, Policy 1: Protect the Island's well-known resources; its mountains and craters; forests and watersheds areas; marshes, rivers and streams; shoreline, fishponds, and bays; and reefs and offshore islands.

Policy 2: Protect Oahu's scenic views, especially those seen from highly developed and heavily travelled areas.

Section 4.4.2 Policies. "Design system elements such as sub-stations and transmission lines to avoid or mitigate any potential adverse impacts on scenic and natural resource values. " Future transmission lines in PUC are to be placed underground."

Section 4.4.3 Guidelines. "If any new or relocated substations or transmission lines are necessary, the selection of the site or route of such facilities should avoid or mitigate any potential adverse impacts on scenic and natural resources."

From your January 20, 2000 letter, which you wrote as Acting Director of Planning and Permitting,
In that (December 7, 1999) letter, following our comments on the City's General Plan regarding the objectives for the natural environment, we inadvertently omitted information to clarify that Sections 4.4.2 and 4.3 are excerpts from the proposed Primary Urban Center Development Plan. The Public Review Draft of this plan represents proposed (but not yet adopted) City policy, and these references were provided in our letter only to alert you of these proposals."

The overhead segment along Waahila Ridge generally uses existing 16-kV subtransmission line easements, and although pole structures would be taller than existing poles, the replacement poles do not represent entirely new visual elements to the area. Although pole heights for the proposed action are higher than the existing poles, the visual simulations and analyses provided in this document indicate that higher poles and conductors (wires) would not substantially interfere with views from scenic points or heavily traveled areas, nor would they substantially interfere with important views of the mountains or the sea or substantially impact any designated scenic views or view planes identified in any county or State plans. Proposed mitigation described in the September 1999 RDEIS (pole painting, landscaping, and adjustment in realignment) reduces these visual impacts, particularly from distant vantage points.

With respect to the reference to "Section 4.4.2 Policies" and "Section 4.4.3 Guideline", you stated in your subsequent letter dated January 20, 2000 letter: "In that [December 7, 1999] letter, following our comments on the City's General Plan regarding the objectives for the natural environment, we inadvertently omitted information to clarify that Sections 4.4.2 and 4.3 are excerpts from the proposed Primary Urban Center Development Plan. The Public Review Draft of this plan represents proposed (but not yet adopted) City policy, and these references were provided in our letter only to alert you of these proposals." The RDEIS discusses the status of the proposed plan and HECo is aware of the proposed policies in the plan's public review draft.

From the December 7, 1999 letter from Jan Naeo Sullivan,

The RDEIS has addressed our initial comments by including additional photo simulations of the lines as viewed from St. Francis School and in simulations and by including additional photo simulations of the lines as viewed from St. Francis School and in Palolo Valley.

As described in the September 1999 RDEIS, the lines (conductors) between the poles were magnified by a factor of four (magnified to 6 inches over the actual size of 1.5 inches) in many of the simulations of the proposed action to illustrate lighting conditions when the conductors would be visible. All simulations prepared for the overhead portion of the project included conductors. However, in some of the simulations, those conductors were not visible in the color prints.

While we recognize the efforts to mitigate some of the adverse visual impacts to the Manoa community (including landscaping, pole color, and reduction in the number of poles), the proposed realignment increases negative impacts to other views, including those from St. Louis Heights, and the visual impact of the proposal on Waahila Ridge would continue to have a significant adverse impact on the scenic resources and panoramic views, as clearly shown in the photos.

Historically, HECo has not observed any erosion or sliding in the vicinity of the existing poles. The proposed steel poles would be placed in the same general area as the existing wood poles along the 46-kV line. Soil types include soils consisting of silty clay and loam over rock or cinders, silty clay and loam over gravelly alluvium, and soils in the classification category of Rock Land established by the U.S. Soil Conservation Service. The poles would have pier foundations with diameters ranging from 5 to 7 feet and depths ranging from 15 to 30 feet. These foundations would be embedded in the rocky ground conditions. With respect to the erosion potential associated with construction of the overhead portion of the proposed action along Waahila Ridge, excavation for the poles would require minimal soil disturbance and would be limited to the area immediately surrounding each individual pole. Since the surface disturbance from siting transmission poles would be minimal, it would not significantly decrease soil absorption or increase the amount of surface runoff. There would be no permanent changes in absorption rates, drainage, or surface runoff. HECo would employ best engineering practices (BEPs) to prevent soil erosion during the construction phase of the project. These BEPs could include the use of portable dikes or sandbags upstream of the disturbed area around each pole to deflect runoff away from bare soil areas. Silt fences could be placed downstream from each disturbed area to retain any sediment that does run off from disturbed areas. Given the distance of both Mana (except by Dole Street) and Paolo Streams from the overhead portion of the proposed project along Waahila Ridge, the existence of intervening roadways and other barriers, or the use of BEPs to contain erosion, it is highly unlikely that infiltration of either stream as a result of construction activities along Waahila Ridge could occur.

There are tradeoffs in the reliability of underground and overhead systems. Overhead lines are subject to more frequent outages, but they tend to be of shorter duration than underground lines. When faults occur in underground systems, repairs tend to be longer, as discussed in Section 3.4.2.3 of the September 1999 RDEIS. When lines are underground, they are not exposed to faults from insulator and shield wire failure, but underground lines experience their own host of problems, as seen in Oahu with respect to cable faults and the downtown network problems and as recently experienced in Auckland, New Zealand.

It is unlikely that poles or lines would be knocked down or cause hazards during storms (high winds, rains, hurricanes, etc.). The minimum recommended design criteria for wind speed for the State of Hawaii, as provided in the National Electrical Safety Code and the American Society of Civil Engineers (ASCE), is 80 miles per hour (mph). The code and guidelines, however, do allow for an increase in the wind speed design criteria based on local wind records. Prior to Hurricane Iniki, HECo used the recommended 80-mph wind speed design criteria. However, after Hurricane Iniki, HECo decided to examine the feasibility of increasing the wind speed criteria. HECo examined the recorded wind speed records for both Hurricane Iwa and Iniki and held discussions with the National Weather Service and with wind experts at the University of Hawaii. After a lengthy study, HECo decided to adopt the design criteria for 100-mph sustained wind speeds for all future transmission lines. HECo determined that by using the 100-mph criteria, there would be a high probability that lines would survive a future "multi-class" hurricane. The proof to support this conclusion is the self-supporting steel poles and lines on Kauai, which remained intact through Hurricane Iniki. These poles were designed for 100-mph sustained winds. The steel poles used for the proposed project would be self-supporting.

For the overhead segment of the 138-kV transmission line, at the top of each pole and attached to the end of a short crossarm would be a shield wire. (A shield wire is a grounded conductor that is positioned to shield the 138-kV and 46-kV circuits on the new steel poles from direct lightning strikes.) Lightning that strikes the shield wire is diverted and conducted to earth (grounded) through the steel pole or structure.

It should be noted that after Hurricane Iniki, the Hawaiian Islands Hazard Mitigation Report, developed by the U.S. Department of Energy's Office of Emergency Management, considered converting existing overhead transmission lines to underground lines, but chose not to recommend that action for reasons of cost and reliability. The report stated that "Based on experiences of other electric utilities, installation of underground electrical services is much more expensive than overhead lines, and can result in reliability problems beginning 10 to 15 years after installation."

Concerning outages caused by contact with trees, HECo's Integrated Vegetation Management (IVM) is designed to address this issue. HECo's IVM program specifies that woody vegetation that matures to heights greater than 4 feet that is within 10 feet of poles and guy wires, and all vines within 10 feet of poles and guy wires, must be controlled or removed. All herbicides used for maintenance are commonly available to the public and are approved by the U.S. Environmental Protection Agency for use in watersheds. Extensive research and experience relative to HECo's selective application of extremely low rates of diluted herbicides within its IVM program have demonstrated that this would result in no harm to the environment or to humans. The new poles proposed for this project would be self-supporting and thus would not use guy wires. Within its easement, HECo manages trees and brush (1) that are capable of growing into the conductors (wires); (2) that obstruct physical or visual access to the lines, poles, or equipment; or (3) that could fall onto lines or equipment. HECo also controls or removes woody vegetation on or along pathways and access roads within the rights-of-way. No large trees would be removed to construct the proposed action.

Further, the Paolo route does not require acquisition of new easements and has a lower amount of transmission system losses.

The "Paolo route" may in fact require acquisition of property and possibly new easements if the HPFF underground alternative along Paolo Avenue is selected. As noted in Section 3.4.2 of the September 1999 RDEIS, significant changes in elevation along the alignment and overall distance between the Kamoku and Pukela Substations may necessitate the construction of intermediate pumping stations to ensure continued fluid flow through the entire alignment. As further described in Section 4.13.2.3 of the September 1999 RDEIS, the HPFF alternative would require a pumping station possibly located on either State or City and County lands.

The relative difference in transmission line losses among the alternatives is incorporated in the present value cost figures, as indicated in column 6, "Transmission Line Losses" in Table 3.2. Thus, the advantage of lower line losses of the Paolo underground alternatives is reflected as a credit against the cost of the alternative, i.e., It reduces the cost of the alternative. This advantage was considered when HECo selected the proposed action from among the transmission line alternatives.

We recognize that the Paiaia Neighborhood Board has taken a strong position in opposition to the Paolo route, but nevertheless think that a more thorough and fair evaluation of this alternative is needed. HECo has provided within the September 1999 RDEIS a full analysis of the all-underground alignment through Paolo Valley. While this alternative is not preferred as the proposed action for reasons summarized in this letter, the alignment remains under consideration should HECo be precluded from constructing the line overhead along Waahila Ridge.

Therefore, the evaluation of alternative actions should include a thorough review of alternatives that focus on improving the reliability and quality of the existing transmission system, including improvements and load-bearing upgrades to existing substations and transmission lines combined with improved security and maintenance.

HECO evaluated a series of alternatives, including ones suggested in your comment, to address reliability issues for the East Oahu Service Area. These alternatives are more fully discussed in Section 3 and Appendices B and C of the September 1999 RDEIS. In summary, these alternatives included demand/conservation alternatives, power generation and storage alternatives, transmission and distribution system alternatives, a no-action alternative, and a deferred action alternative.

With respect to constructing a 138-kV transmission line between the Kamoku and Pukela Substations, HECo evaluated 11 different routes, technologies, and configurations of overhead and underground lines. A discussion of the alternatives follows.

Alternative Routes and Technologies to Connect Kamoku and Pukela Substations

There are three technically feasible methods of constructing a 138-kV transmission line between the Kamoku and Pukela Substations: (1) conventional overhead construction; (2) high-pressure fluid-filled pipe (HPFF) underground construction; and (3) solid dielectric, cross-linked polyethylene (XLPE) underground construction. Combining overhead construction with either one of the underground construction technologies is also technically feasible. For example, transmission lines can be underground along one segment of an alignment or route, and then be overhead along another segment of the alignment with the addition of either a transition station (for an HPFF system), or a tower pole (for a solid dielectric, XLPE system).

In addition to three different construction technologies, there are a variety of ways to route the transmission line from the Kamoku Substation to the Pukela Substation. Work leading up to the publication of the May 1998 DRAFT focused on developing the alternatives based on alignments and technologies (with community participation), analyzing the alternatives in detail, and selecting a proposed action based on that analysis. The following 11 transmission line alternatives were selected for evaluation:

- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE combination alternative (proposed action)
- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-King Street-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-Dole Street-Waahila Ridge overhead alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-Palo Avenue XLPE underground alternative
- Kapiolani Boulevard-Palo Avenue HPFF underground alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFF combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFF combination alternative

Demand-Related Alternatives

Demand-Side Management. Demand-side management (DSM) programs attempt to encourage customers to conserve electrical use by providing various financial incentives. By conserving the amount of energy used by the consumer, the amount of electricity generated can be reduced. HECCO has already developed DSM programs and has developed a 20-year, long-range plan, the Integrated Resource Plan (IRP), 1998-2017, combined with a 5-year action plan. Over the next 5 years, HECCO's current energy-efficient DSM programs are forecast to reduce the annual growth in demand for additional electricity by approximately 1/2 to 1 percent. While this damping could defer transmission line overloading issues in a 1- to 5-year time period, eventually demand would grow to a point where the overloading problem would reappear. In addition, the reliability issues facing the Pukela and Kamoku Substations would not be addressed by relying solely on DSM measures.

Revisions to the Load Forecasts. HECCO regularly produces and updates forecasts on Oahu's projected electrical use. Through these forecasts, HECCO identifies potential overloading problems to address. Downward revisions in the projected amount of electrical use could move back the date of anticipated overloads. However, unless demand for additional electricity were to stop altogether, revisions to numbers are unlikely to prevent the overload from occurring. In addition, the reliability issues facing the Pukela and Kamoku Substations would not be addressed by this alternative.

Generation-Related Alternatives

Generation-related alternatives consist of various alternative and conventional technologies to produce electricity in East Oahu. By placing generation capabilities in East Oahu, energy could be produced to meet the growing demand in the region and provide an additional source of power independent of the West Oahu transmission line feeds, thus providing increased reliability. However, it should be noted that generation-related alternatives also require transmission systems to deliver the power to customers, which might raise new generation facility and transmission line siting and permitting issues. In addition, most of the following generation-related alternatives might solve some, but not all, of the reliability problems identified for the project.

Wind. Wind energy conversion systems convert wind energy into electricity by collecting the wind's kinetic energy with blades connected to a drive shaft that turns a turbine generator. Wind is not a firm source of energy. Therefore, wind must be accompanied with an energy storage device at an additional cost to be able to provide a reliable supply of energy during no wind periods. In addition, finding suitable wind sites near the Pukela substation service area would be very difficult. On Oahu, the best wind sites identified in the 1980s were along the tips of the island (Kahuku and Kaena Point). These installations would be along the ridge-lines of the Ko'olau and Waianae mountain ranges. There are no feasible East Oahu wind sites available unless one proposes to install wind turbines near Makapuu or the main Ko'olau ridgeline from Manoa to Hawaii Kai. No wind developer has shown any interest in these areas.

Wind energy conversion systems depend upon adequate winds to drive the system and require approximately 3 acres per 500-kilowatt turbine. Therefore, to meet the 200-MW demand represented by the Pukela Substation, more than 1,200 acres would be required. Such large land requirements and high cost made this alternative impractical within the East Oahu area.

Pumped Storage/Hydropower. This technology requires that water be pumped during low-power demand periods from a lower reservoir to a higher reservoir. That water would be released during periods of high power demand to turn turbines and generate electricity. Two areas were considered adequate for such use in East Oahu: Koko Head Crater and Kaua Crater. Costs to convert the craters to reservoirs would range from \$160 to \$260 million. The high costs and significant adverse environmental impacts associated with submerging the inner crater habitats made this alternative unacceptable.

Solar. Electricity can be generated from sunlight through the use of photovoltaic (PV) cells or solar thermal energy conversion. Solar power is not a firm energy source and operates only when the sun is shining. As such, grid-connected photovoltaic systems (without batteries) are not base load facilities. HECCO is not aware of any commercial photovoltaic base load facility (with battery or other energy storage device) on a grid-connected system. Approximately 5 to 10 acres of land would be required to house the equipment necessary to generate one MW of electricity. To generate the necessary 200 MW for this project, between 1,000 and 2,000 acres of relatively flat land would be required. In addition, capital costs for such a large-scale solar-based system are estimated to be between \$1 billion and \$2 billion. Such high costs and land requirements make this an impractical alternative. On a smaller scale, solar power systems at each customer's location could be used to help reduce both the energy and peak demands on the system. While this alternative might reduce system loads, customers would still need to rely on the transmission and distribution system for reliable electrical service.

Battery Energy Storage. A battery energy storage system can store excess energy and release that energy as required. Systems consist of banks of batteries that supply power to the system for approximately 4 to 7 hours. About 20 acres of land would be required to house the batteries necessary to provide 200 MW of power to East Oahu with an estimated installation cost of approximately \$186 million. Generally, use of such battery systems is environmentally benign. However, the quick depletion rate of the batteries does not make them a reliable backup system should a transmission line fail. This alternative was therefore considered impractical.

Fuel Cells. Fuel cells are devices that produce energy by creating a reaction within an electrolyte substance using a combination of heat and a chemical agent. Applications of this technology are limited and are still for the most part, in the demonstration stage. HECO has been tracking the progress of Ballard Power Systems as well as other fuel cell manufacturers and developers. HECO has visited many manufacturing plants and demonstration projects and held discussions with the personnel of these facilities on future plans for their fuel cell products. The four major classes of fuel cells currently undergoing development are phosphoric acid fuel cells (PAFC), molten carbonate fuel cells (MCFC), solid oxide fuel cells (SOFC), and polymer electrolyte membrane fuel cells (PEMFC). Currently, ONSI is the only company to offer a commercial fuel cell unit. The price of ONSI's 200-kW PAFC fuel cell stack is approximately \$4,250 per kW. Fuel cells are being developed to use hydrogen, natural gas, or propane. In Hawaii, synthetic natural gas or HD-5 grade propane would need to be used.

Recent applications of this technology include the 11 MW PAFC facility in Japan (1991) which required about 1 acre of land and the 1 MW PAFC facility in Alaska (1995) which required about 0.14 acre of land. To generate the necessary 200 MW for this project in a central plant fashion utilizing ONSI's 200-kW PAFC fuel cell stack, approximately 18 to 30 acres of land would be required to meet project needs, and capital costs would range from \$600 million to \$850 million. The development of fuel cell technology from a demonstration stage into a viable and affordable commercial application is not anticipated to occur within the timeframe to address the East Oahu electrical needs.

Ocean-Derived Energy. Energy from the ocean can be produced through either ocean thermal energy conversion or ocean wave energy conversion. Ocean energy conversion systems require large facilities on the shoreline, and capital costs to meet project needs would range from \$1.2 to \$2.6 billion. The use of ocean thermal energy conversion within East Oahu appears to be limited for several reasons: the lack of available commercial-sized applications, the limited power production from the technology, the controversies surrounding use of shoreline property, and the potential environmental impacts on the off shore and near-shore habitats.

Biomass Conversion. Biomass generating facilities use organic matter that is available on a renewable basis as fuel in direct-fired, steam-electric power plants. When the sugar industry had a strong presence on every island, biomass generated electricity was a prime and very large renewable energy contributor in Hawaii. Capital costs for a typical biomass plant of the size necessary to meet project needs could range from \$340 to \$460 million. Approximately 3,200 dry tons per day of fuel and 16 million gallons of water per day would be required to meet project requirements. There are no land and water resources available in East Oahu for a biomass plant. About 56,000 acres of crop are needed for a 200 MW biomass plant (assuming an cane by cane crop). These concerns, as well as the overall costs associated with construction and operation of a biomass facility, did not make this alternative viable.

East Oahu Base Load Facility. This alternative would consist of locating a large, 200-MW base load generation facility in East Oahu. The facility would be either coal- or diesel-fired. Approximately 30 acres of land would be required for the plant and related fuel storage areas. Capital costs would range from \$280 to \$460 million. Several studies have considered siting such a facility in East Oahu; however, the air emissions restrictions, incompatible surrounding land uses, and the need to truck fuel over long distances through densely populated areas have made such a facility unrealistic.

Honolulu Power Plant Renovations. This alternative would consist of retaining the Honolulu Power Plant and refurbishing and re-powering the existing turbines. The resulting additional capacity could then be fed back into the system. However, creating additional capacity would require approval of new air quality permits for the plant. Approval would be unlikely given the plant's proximity to high-rise residential units. Even if approval were obtained, this alternative would not address the reliability issues facing the Koolau and Pukela Substations.

Combined Alternatives (Distributed Generation). The 1995 Kamoku-Pukela 138-kV Transmission Alternatives Study (Appendix C1 of the September 1999 RDEIS) evaluated a combination of

alternatives to replace or defer the Kamoku-Pukela 138-kV Transmission Line project. The combination of alternatives evaluated included aggressive demand side management (DSM), updated forecasts, increased maintenance, fuel cells, and a battery energy storage system. It was concluded in 1995 that the combination of alternatives would cost in excess of \$180 million, making this proposal impractical to replace or defer the proposed project.

Since the 1995 study, there have been more discussions in the utility industry on the concept of distributed generation (DG) or distributed power. DG could be implemented with a combination of different technologies depending on the technical objectives and physical parameters of a project. DG is defined as "retail power" sited either on or in close proximity to the end-use customer's premises either by customers, an energy services provider or other third-party which owns, operates, and contractually controls the use of the generation asset. "Retail power" implies the generation assets' output is dedicated and its operating regime is tailored to the needs of specific customers or specific aggregated loads assembled contextually by the energy service provider or by the implementer of the resource. The technologies that are typically associated with DG are internal combustion engines (ICBs), microturbines, and fuel cells. Other technologies such as photovoltaics (PV), battery energy storage, or wind power can also be associated with DG. However, for the purpose of analyzing the potential of such technologies as a DG source alternative to the proposed action, these technologies were screened out on a cost, technical and/or practical basis.

HECO evaluated a variety of scenarios to implement DG as a practical alternative to the project and assumed that at least 39 MW of emergency generating capacity already exists in the Pukela substation service area. These scenarios included the installation of 161 MW of all-ICBs, of all-microturbines, of all-fuel cells, and a portfolio (combination) of ICBs, microturbines, and fuel cells. The cheapest DG scenario was the installation of all-ICBs, which had an estimated capital installed cost ranging from \$81 million to \$161 million. The most expensive DG scenario was the installation of all-fuel cells, which had an estimated capital installed cost ranging from \$161 million to \$405 million. The estimated capital installed costs for the all-microturbines scenario ranged from \$145 million to \$258 million. The portfolio of ICBs, microturbines and fuel cells scenario ranged from \$122 million to \$343 million.

The cheapest DG scenario, the installation of all ICBs, was not considered a practical alternative because of the high costs and the feasibility of installing ICBs in the residential and commercial areas of the Pukela substation service area. In regards to high costs, the installation of all-ICBs was estimated to be \$250 million to \$130 million more costly than the proposed action and \$25 million to \$105 million more costly than the most expensive transmission line alternative (Kapolei Blvd.-Lower Camps-Waialua Ridge XLPE underground). In regards to feasibility, approximately 80 to 2,600 ICBs (depending on size) may have to be installed throughout residential and commercial areas of Marana, Saint Louis Heights, Pablo, Kahala, Kapihau, McCully, Moiliili, and Waikiki. Given the air emissions and noise associated with ICBs, it is unlikely that ICBs would be a permitted or highly desirable use in these areas.

The installation of a portfolio of ICBs, microturbines and fuel cells, was also not considered a practical alternative because of the high costs and other implementation hurdles. Given the advantages and disadvantages of the DG technologies, existing zoning regulations and the market directions of the different DG technologies, it was determined that large customers could be served by ICBs, commercial/general service customers by microturbines, and residential customers by fuel cells. Given this criteria and the composition of the 60,000 customer accounts in the Pukela substation service area, it was calculated that 67 MW of ICBs, 57 MW of microturbines and 37 MW of fuel cells would need to be installed. This amounted to an estimated total capital installed cost range of \$122 million to \$343 million in comparison to the proposed action of \$31 million.

There are additional technical and environmental issues associated with the implementation of a DG portfolio that cause it to be an impractical alternative. These issues include fuel supply, siting, operations and maintenance, electrical interconnection, permitting, other costs, load diversity and downtown overloads.

Given the high capital costs (\$81 million to \$805 million) and the numerous technical uncertainties, DO is not a practical alternative to the proposed action (\$31 million) of constructing a 138-kV line between Kamoku and Pukela substations.

Transmission and Distribution System Alternatives

Undersea Cable. This alternative would consist of installing an undersea cable from Barbers Point to the Kamoku Substation. Estimated cost for the cable would be approximately \$49 million in 1994 dollars. This alternative would relieve the overloading problems at the Iwilei and School Street Substations. However, it would not provide an additional feed to the Ko'olau and Pukela Substations and, therefore, would not ensure any measure of greater reliability to the Pukela Substation. Should both Ko'olau-Pukela transmission lines fail simultaneously, the Pukela Substation would still drop out of service. In addition, this alternative would result in significant adverse impacts to the near-shore marine environment. For these reasons, this alternative has been eliminated from further consideration.

Reduced Pukela Service Area. This alternative would consist of reducing the demand on the Pukela Substation by transferring load to 145-kV transformers within the Kamoku and Aicher Substations. The cost of this alternative would be approximately \$60 million. System reliability problems at Kamoku Substation would not be met since Kamoku would have only one feed and power could not be transferred from Pukela to Kamoku. In addition, the instances of low voltage drops would increase, which have the potential to damage sensitive electrical equipment in homes and businesses. The costs of this alternative, along with its deferral of the overloading problem by only 2 years, made this solution impractical.

Kamoku-Pukela 46-kV Network Alternative. This alternative would require the reconfiguration of the existing 46-kV subtransmission system to provide a transmission path between the Kamoku and Pukela Substations. Duplicate 46-kV transformer capacity would be installed at the Kamoku and Pukela Substations, and current flow direction between the two substations would be manually switched during times when the 138-kV transmission lines were out of service. The cost of this alternative is estimated at more than \$30 million. This alternative meets the project needs relating to the reliability of the Pukela and Kamoku Substations and also relieves the projected overloading of the Ko'olau Substation. However, this alternative would accelerate the overloading conditions on the downtown substations by 2 years. Addressing the downtown substations' overloading issues would require additional capital costs. In addition, a technical analysis of this alternative suggests that its implementation would increase the number of transformer short circuits, voltage drops, and transmission line losses because, over the long term, the 46-kV system would not be capable of handling the large amounts of electrical power being transmitted at peak times.

Halawa-Pukela 138-kV Transmission Line. This alternative would consist of constructing a single-circuit 138-kV transmission line from the Halawa Substation to the Pukela Substation. The cost of this alternative is estimated at more than \$30 million. This alternative would alleviate the overloading problems at the Ko'olau Substation and would provide the necessary reliability to the Pukela Substation. However, the transmission line would not address the overloading problems at the downtown substations, nor would it provide the necessary reliability to the Kamoku Substation. Separate and additional 138-kV transmission lines would need to be constructed to address these individual concerns.

Increased Maintenance and Security. Increasing maintenance and security procedures could reduce the number of transmission line faults that occur. Although greater maintenance and security could help reduce problems before they occur, this alternative does not address the greater problems of projected overloads and required reliability.

No-Action Alternative

Under the no-action alternative, a 138-kV transmission line would not be constructed between the Kamoku and Pukela Substations. In this scenario, continued growth in electrical demand in the East Oahu Service Area would result in the following system problems:

- Potential loss of electricity to the Pukela Substation Service area should the two transmission lines feeding the substation be out of service simultaneously
- Overloading of the third 138-kV transmission line to Ko'olau Substation when the other two 138-kV transmission lines were out of service, projected to occur in the year 2002
- Overloading of the third 138-kV transmission line to the downtown substations when the other two 138-kV transmission lines were out of service, projected to occur with the retirement of the Honolulu Power Plant or in the year 2016, whichever comes first
- Inability to reliably service new large load demands in the Kakaako/Ala Moana/Waikiki area

The no-action alternative would not meet the purpose and need criteria established for this project and would increase the risk of major electrical system outages in the near future. For this reason, it is not a viable alternative.

Deferred Action Alternative

The deferred action alternative assumes that the 138-kV transmission line would be constructed between the Kamoku and Pukela Substations at a later date than the projected timetable. Delaying the construction and startup of this transmission line would increase the risk of a major electrical system outage in the East Oahu area from forecasted overloads during emergencies at the Ko'olau Substation and the downtown substations should HEFCO retire the Honolulu Power Plant. In addition, further delay in solving the reliability problem of the Pukela Substation would only serve to increase the risk of an outage caused by the failure of either one of the two transmission lines serving the substation while the other is undergoing maintenance. Although the deferred action alternative would eventually meet the purpose and objectives outlined for this project, the delay would burden HEFCO customers with additional costs and a greater risk of outages than would construction of the project under the existing schedule. For this reason, the deferred action alternative was not considered viable.

For more information concerning the topic of alternatives as they relate to the proposed Kamoku-Pukela 138-kV Transmission Line Project, refer to Section 3.0 of the September 1999 RDEIS.

Thank you for taking the time to review the September 1999 RDEIS. Included with this letter is an enclosure showing substantive revision changes made to the text of the September 1999 RDEIS and included in the RFEIS. New text in the RFEIS is underlined and text deleted from the RDEIS is crossed out. In the enclosure, the term "EIS" refers to the RFEIS (including all of its appendices in separate volumes).

Please feel free to contact me if you have further questions or comments regarding this project. If you would like to secure your own copy of the RFEIS, please request it in writing and direct your request to me at the address listed at the top of the first page of this letter. The overall organization of the RDEIS and the general content of the volumes (3-ring binders) are indicated in an enclosure to this letter. Because of the size of the RFEIS, please allow five to ten working days for the processing and mailing of your request.

Randall K. Fujiki
June 15, 2000
Page 14

Again, thank you for your comments.

Sincerely,

CH2M HILL



Paul Luersen, AICP
Senior Project Manager

cc: State of Hawaii Department of Land and Natural Resources, Land Division
State of Hawaii Office of Environmental Quality Control
Hawaiian Electric Company, Inc.

JEREMY HARRIS
Mayor

DEPARTMENT OF ENVIRONMENTAL SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KONG STREET, 3rd FLOOR • HONOLULU, HAWAII 96813
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KENNETH E. SPRAGUE, P.E., M.D.
Director
MARY FURUTAGA
Deputy Director



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& DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

NOV - 3 1999

Mr. Timothy Johns, Director
Department of Land and Natural Resources
State of Hawaii
1115 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Johns:

Subject: Revised Draft Environmental Impact Statement (RDEIS)
Kameoku-Pukela 138-kV Transmission Line Project
TMK: Various

We have reviewed the subject RDEIS and have no comments to offer at this time.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer,
at 523-4160.

Sincerely,

RECEIVED
DIVISION OF
LAND MANAGEMENT
Nov 5 3 51 PM '99

KENNETH E. SPRAGUE
Director

cc: Hawaiian Electric Co., Inc. (Mr. Kerstan Wong)
CH2M Hill, Inc. (Mr. Paul Luersen)

CA-SIR-5
DOCKET NO. 03-0417
PAGE 39 OF 113

CH2MHILL

December 7, 1998

Ms. Sara Banaszak
1711 East-West Rd., MSC 728
Honolulu, HI 96848

Subject: Hawaiian Electric Company, Kamoku-Pukele 138-kV Transmission Line Project Draft Environmental Impact Statement Comments

Dear Ms. Banaszak:

Thank you for your letter concerning the Kamoku-Pukele 138-kV Transmission Line Project Draft Environmental Impact Statement (EIS). Our responses to your individual comments follow:

1. *The DEIS (Appendix M) includes correspondence from the Hawaii Department of Transportation requesting that the lines along Kapiolani Blvd. be underground, and the DEIS refers to this in explaining its preferred option, which is no longer least-cost. However, the reason this request was made and responded to in the choosing of the preferred action should be made clear to the public. Will the Hawaii Department of Transportation be paying for the incremental cost of putting lines underground along Kapiolani Blvd.?*
As noted in Section 3.3 and Appendix B of the Draft EIS, there were a variety of factors considered and evaluated by HEICO in selecting the proposed action. The comment by the State Department of Transportation was not the only reason to place the line underground along Kapiolani Boulevard. Other reasons included mitigation of impacts from implementation of ROH Section 14-22.1, requirements of HRS 269-27.6 concerning high-density population areas, and other factors that are described in detail in the Draft EIS. It is our understanding that no public agencies that have suggested or requested that the line be placed underground have offered to pay the cost differential between underground and overhead options, as was suggested by the state legislature with the passage of Act 133.

2. *HECO is willing to bear a 28% cost increase to go underground along Kapiolani Blvd. and for the entire section from Kamoku Substation to Waahila Ridge, but it is not willing to bear an identical cost increase to go all underground.*
We must disagree with your representation of "willingness to bear," as HEICO's customers ultimately bear costs. The proposed alternative for placing the line underground along Kapiolani Boulevard was chosen for statutory and/or regulatory and/or engineering reasons. As noted in Section 3.3 and Appendix B of the Draft EIS, HEICO considered a variety of factors before selecting the proposed action. Cost comparison and analysis was just one of the factors for selecting the proposed action. The Draft EIS contains a complete discussion of all of the factors.

Ms. Sara Banaszak
Page 2
December 7, 1998

3. *Will any trees be cut down? How many? How much ground area will be cleared?*

No large trees would be cut down to construct the proposed action because the proposed transmission line poles would replace the existing 46-kV subtransmission line poles. To maintain the right-of-way, vegetation within 10 feet of the poles that grows higher than 4 feet would be managed pursuant to HEICO's Integrated Vegetation Management (IVM) program guidelines.

HECO has not explained how it plans to install these poles in the exact location of the current poles. Will they be installed next to the existing poles, which will then be removed? This would, then, affect a much greater area.

Temporary wooden poles would be erected adjacent to the existing poles and the existing poles would be removed. Pole foundations would be excavated by hand and the new steel poles would be installed as described in Section 3.4.1.2 of the Draft Environmental Impact Statement. HEICO would use vegetation practices that are designed to minimize environmental impacts and prevent erosion. Within the Conservation District, vegetation clearing and maintenance would be restricted to areas required for construction access and would include flora capable of growing into or falling onto transmission lines, poles, or equipment and flora that could restrict access for inspection, maintenance, and repair.

Since this statement acknowledges that underground options have a lower visual impact than overhead options—at a level great enough to sway HEICO decision-making, why is this not also acknowledged in comparisons of options, such as in Table ES-1? How can HEICO consider this a factor in its decision, but declare overhead options as having "insignificant impact" visually?

The decision to place a portion of the proposed action underground within the high-density population area was made based on technical and engineering factors. The Public Utilities Commission, as discussed in Section 6 of the Draft EIS, has clearly indicated that mitigation of potential visual impacts is not a compelling reason to justify the undergrounding of transmission lines.

In reviewing the level of visual impacts associated with the proposed action along Waahila Ridge, we were guided by the criteria contained in Section 11-200-12, Hawaii Administrative Rules (HAR), which state that, "In most instances, an action shall be determined to have a significant effect on the environment if it, '(12) Substantially affects scenic vistas and view planes identified in County or State plans or studies;'" We have not been able to identify any county or state plans or studies that designate Waahila Ridge as a scenic vista or view plane that could be "substantially affected" as defined by the criteria.

While the proposed action would alter the existing visual condition, we do not believe the visual impacts of the proposed action should be considered significant. Many individuals, including yourself, have expressed the opinion that the potential visual impact of the proposed action could indeed, "involve a substantial degradation of the environmental quality," as stated under 11-200-12(7), HAR, and thus could result in a significant adverse visual impact. Given the subjective nature of any visual resource assessment (beauty is in the eye of the beholder) and the rather vague and ambiguous

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significance criteria outlined in 11-200-12(7), HAR, we cannot argue with the validity of anyone's opinion regarding the visual significance and related impacts of visual resources. While some people may not perceive it as a significant adverse visual impact, we must recognize the importance of the many comments received reflecting an opinion that the proposed action would result in a significant adverse impact.

The Final EIS will include additional mitigation measures that may minimize the visual impact of the project. These may include painting the poles to blend in with the background landscape, strategic landscape plantings of vegetation to provide a more diverse landscape and reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridge line.

6. *HECO offers as further explanation for its current proposed action that it "minimizes EMF when compared to the lower-cost overhead alternatives . . ." This is similarly in direct conflict with earlier treatment of EMF issues as inconclusive, and, therefore, not a factor in evaluating (all) options.*

HECO has adopted a "prudent avoidance" approach in the planning and environmental evaluation of alternatives. This approach is consistent with the State of Hawaii Department of Health Policy Relating to Electric and Magnetic Fields from Power-Frequency Sources. Briefly, it is an approach to making decisions about risk. When applied to EMF, it means that reasonable, practical, simple, and relatively inexpensive measures are taken to avoid or reduce public exposure to EMF. Figures 4-39 through 4-49 illustrate that the proposed action does minimize exposure to magnetic field increases within high-density population areas. The proposed action, for the most part, maintains any EMF increases within the bounds of the public street right-of-way. Note that while the levels of EMF can be measured, the health effects of EMF are inconclusive.

7. *The poles on Waahila Ridge would be approximately 50% taller, would carry more power lines than the current poles, and would be wider, especially where the H-style pole construction is used. It is difficult to imagine how a project with these features would not have a significant visual impact.*

Please see our response to your Comment #5.

8. *Earlier PUC statements are not inherently relevant to the currently proposed project, which involves a highly visible natural ridge line and a popular park.*

We must disagree. Earlier PUC statements are quite relevant. Moreover, they were made with respect to the need for the line, not the route.

9. *Could the proposed alternative underground route along Palolo Avenue enable removal of the existing lines along the Waahila Ridge? Such an option could not only facilitate public support for the project, but could also enable HECO to seek assistance in funding the incremental cost. As such, a proposal would represent an investment in Hawaii's future.*

The installation of the alternative underground route along Palolo Avenue would not enable removal of the existing lines along Waahila Ridge. The existing lines on Waahila bring 46,000 volts of electricity from Pukela Substation to distribution substations in neighboring communities such as Manoa and McCully/Moiliili. The new transmission

line, at 135,000 volts, would supply bulk power from HECO's generating stations in West Oahu to Pukela and Koolau Substations. Therefore, the existing lines on Waahila serve a different function from that of the proposed transmission line.

Thank you for taking the time to review the Draft EIS. Please feel free to contact me if you have further questions or comments regarding this project. If you would like to secure your own copy of the Final EIS, please request it in writing and direct your request to me at the address above.

Again, thank you for your comments.

Sincerely,

CH2M HILL.

Mark R. Willey

Mark R. Willey
Project Manager

cc: Kerstan Wong, HECO
San Lemmo, DLNR
Gary Gill, OEQC



June 15, 2000

Donna Wong
Hawaii's Thousand Friends
305 Hihani Street, PMB 282
Kailua, HI 96734

Subject: Hawaiian Electric Company, Inc.'s Kamaka-Pukela 138-kV Transmission Line Project Revised Draft Environmental Impact Statement (September, 1999)

Dear Ms. Wong

Thank you for your comment letter concerning Hawaiian Electric Company, Inc.'s (HECO's) Kamaka-Pukela 138-kV Transmission Line Project Revised Draft Environmental Impact Statement (RDEIS). Our responses to your individual comments follow. Your comment letter and this response letter will be included in the *Revised Final EIS (RFEEIS)*.

Table 3-5 table

This table neither defines "Impact (not significant) and "Significant Adverse Impact" nor describes how Impacts are determined. What criteria is used to determine Impacts? Why is undergrounding along Palolo Avenue considered no impact when Waahila Ridge undergrounding along Kapiolani Blvd. is considered to have Significant Adverse Impact?

The terms impact and significance are defined through the Hawaii Administrative Rules (HAR) governing the State's environmental process, HAR, Title 11, Chapter 200. The terms are defined within those rules as follows:

- "Environmental 'impact' means an effect of any kind, whether immediate or delayed, on any component of the environment." Impacts may be either positive [Beneficial] or negative [adverse].

• "...Significant effect" or "significant (adverse) impact" means the sum of effects on the quality of the environment, including actions that irreversibly commit a natural resource, curtail the range of beneficial uses of the environment, are contrary to the state's environmental policies or long-term environmental goals and guidelines as established by law, or adversely affect the economic or social welfare, or are otherwise set forth in Section 11-200-12 of the administrative rules."

The term "adverse" has been inserted in Table 3-5 (see enclosure) of the September 1999 RDEIS, to better clarify the negative nature of significant impacts as defined by law.

The criteria for determining whether a negative impact is significant are contained in its definition, in that there must be an irrevocable commitment of natural resources, a curtailment in the range of beneficial uses of the environment, a preclusion with existing laws, or adverse economic or social welfare effects.

Using this definition, your remaining questions on significant impacts between the two off-underground alternatives you cite can be answered. The off-underground alternative over Waahila Ridge would result in the permanent destruction of several acres of natural habitat, some of it used for foraging and/or containing species of concern (e.g., *Sinclairia calidra*, a land snail to the State or the U.S. Fish & Wildlife Service. This habitat would not be replaced; therefore, its destruction would be irrevocable and last forever (a significant "adverse" impact). In addition, this alternative could also result in the permanent and irrevocable destruction of identified archaeological resources along the potential alignment, which would result in a significant adverse impact to cultural resources, as indicated in Table 3-5.

Table 3-5

| Resource Area | Proposed Action Kapiolani Blvd.- Lower Campus- Washila Ridge Combination (XLPE) ^a EMP | Alternatives Evaluation Summary | | | | | | | | | |
|--|--|---|---|--|--|--|--|--|--|--|--|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| | Kapiolani Blvd.- Lower Campus- Washila Ridge Overhead (XLPE) ^b | No | No | No | No | No | No | No | No | No | No |
| | King St-Lower Campus- Washila Ridge Overhead | Yes Yes No | Yes Yes Yes | Yes Yes Yes | Yes Yes No | Yes Yes No | No Yes No | No Yes No | No Yes No | Yes Yes No | Yes Yes No |
| ENP reduction in residential area | No | No | No | No | No | No | No | No | No | No | No |
| ENP reduction in conservation area | Yes Yes No | Yes Yes No | Yes Yes Yes | Yes Yes Yes | Yes Yes No | Yes Yes No | No Yes No | No Yes No | Yes Yes No | Yes Yes No | Yes Yes No |
| Sensitive sites identified | No | No | No | No | No | No | No | No | No | No | No |
| Varietal Impacts | From high density pop. area | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Introduction of new element | No (existing lines) | Yes | Yes | Yes | Yes | Yes | Yes (new easement) | Yes (new easement) | No | No | No |
| General Aesthetics | No | No | No | No | No | No | No | No | No | No | No |
| Proximity to High-Density Population Area | No | Yes | Yes | Yes | Yes | Yes | No | No | No | No | No |
| Present Value Costs (1999 \$) | \$30,751,476 | \$27,969,422 | \$28,198,141 | \$23,046,598 | \$55,672,709 | \$46,047,276 | \$39,369,084 | \$46,402,903 | \$33,619,121 | \$30,040,105 | \$32,779,277 |
| Socioeconomic | No | No | No | No | No | No | No | No | No | No | No |
| Area important to Tourism | No | No | No | No | No | No | No | No | No | No | No |
| Industry depends on beauty | No | No | No | No | No | No | No | No | No | No | No |
| Safety and Liability | No | No | No | No | No | No | No | No | No | No | No |
| Risk from natural hazards | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low |
| Risk from general public | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low |
| Risk to general public | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low | Low |
| Maintenance | Medium | Medium | Medium | Medium | Medium | Medium | High | High | High | Medium | Medium |
| Man & Inspection Difficulty | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks | Weeks |
| Length of repair time | Days | Days | Days | Days | Days | Days | Days | Days | Days | Days | Days |
| Government Regulations | No | No | No | No | No | No | No | No | No | No | No |
| Exhibiting Constraint | DP Map DOT (2) CDUA | DP Map DOT (1) CDUA | DP Map DOT (1) CDUA | Yes (14-22 ROH) DP Map DOT (1) CDUA | No | DP Map DOT (2) CDUA | DP Map DOT (1) CDUA |
| Discretionary Permits | No | No | No | No | No | No | No | No | No | No | No |
| Construction Issues | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County | UH, State, County |
| Length of Time | 18 months | 12 months | 12 months | 12 months | 24 months | 24 months | 24 months | 24 months | 18 months | 18 months | 18 months |
| Length of System | 19,800 ft. | 19,400 ft. | 20,000 ft. | 20,700 ft. | 20,400 ft. | 19,100 ft. | 19,100 ft. | 19,100 ft. | 19,800 ft. | 20,250 ft. | 20,250 ft. |
| Public Sentiment | McCully-Yes Manoa-No St. Louis-No Paloio-Yes Kaimuki-Yes | McCully-No Manoa-No St. Louis-No Paloio-Yes Kaimuki-Yes | McCully-No Manoa-No St. Louis-No Paloio-Yes Kaimuki-Yes | McCully-Yes Manoa-No St. Louis-No Paloio-Yes Kaimuki-Yes |
| Neighborhood Board resolutions in affected area | No | No | No | No | No | No | No | No | No | No | No |
| Other Relevant Factors | No | No | No | No | No | No | No | No | No | No | No |
| Biological Resources | No | No | No | No | No | No | No | No | No | No | No |
| Cultural/Historic Resources | No | No | No | No | No | No | No | No | No | No | No |
| Geophysical Resources | No | No | No | No | No | No | No | No | No | No | No |
| Property Values | No | No | No | No | No | No | No | No | No | No | No |
| Non-Electric Infrastructure | No | No | No | No | No | No | No | No | No | No | No |
| Conflict with identified proposed project | No | No | No | No | No | No | No | No | No | No | No |
| Precedent Issue | No | No | No | No | No | No | No | No | No | No | No |

No Impact

Adverse Impact (not significant)

Significant Adverse Impact

^a Alignment adjustments 1 and 2 apply to this alternative

^b Alignment adjustment 1 applies to this alternative

Alignment adjustment 2 applies to this alternative

Legend:

UH = University of Hawaii

DP = Development Plan

DOT = Transportation

In comparison, the all-underground alternative along Kapilani Boulevard and Palelo Avenue would be contained within an existing city street system. No permanent loss of vegetation or disruption to cultural resources is anticipated and "no impact" (negative or positive) at all has been identified for any of the other relevant factors listed in the table.

3.44 Overhead Construction Methods

What is meant by "generally" when referring to height and location? How much height and location variation would qualify as being "generally" the same? How many "temporary" poles would be installed and what is the cumulative environmental impact of clearing areas for pole placement and digging six to eight foot holes twice?

As indicated in Table 3-1 in the September 1999 RDEIS, which gives a range in height for the proposed poles, pole heights may vary by as much as five feet depending on final survey information and final design. Describing the poles for the proposed overhead alignment on Waahila Ridge as being placed within the same "general" location as the existing poles is to account for situations where the new pole cannot be placed in the exact same hole or location as the existing pole. Although it is HECO's intention to place the new pole in the same location as the existing pole, circumstances during construction may make that impractical. By using the term "general" location, HECO is indicating a location within the bounds of the pole line easement and, if at all possible, within an approximate 10-foot radius from the location of the existing pole site that the new pole is to replace. HECO is unable at this phase of the project (until final detailed engineering design is completed) to provide more precise pole location differences.

As described in Section 3.4.1.2 of the September 1999 RDEIS, HECO will be installing temporary poles as necessary within the easement to facilitate the removal of the existing poles and installation of the new steel poles. The existing 46-kV conductors will need to be temporarily spread or transferred to the temporary poles such that the new steel poles can be lifted and placed in their permanent locations. Basically how many temporary poles will be needed and the exact location of these poles have not been determined. It is anticipated that each temporary pole would be wooden and would generally have the same height and appearance as the existing wooden pole it would replace. The temporary poles would be placed directly into the ground to a depth of six to eight feet near the existing poles and not in the same exact location. The temporary poles with 46-kV conductors will be energized and de-energized as necessary to facilitate the installation of the 138-kV steel poles.

Each temporary pole would remain until the corresponding steel pole is installed and the 46-kV conductors can be reattached in a permanent position onto the new steel pole. Removal of the temporary wooden poles would generally entail cutting the poles with hand-held equipment, removing the posts by helicopter if no vehicular access exists, digging out the remaining pole segments in the ground, and restoring the sites with soil and vegetation according to HECO's Integrated Vegetation Management (IVM) Program.

With respect to your concerns related to clearing areas for pole placement, HECO does not anticipate an extensive clearing of vegetation on Waahila Ridge. The transmission line poles for the proposed action would be in the same general area as the existing 46-kV poles. It is expected that vegetation disturbance would be restricted to the areas immediately surrounding each pole. Any such disturbance would be in accordance with HECO's IVM program. It is possible that some native vegetation would need to be removed to install the new transmission line poles. However, if practical, the removal of native plants would be avoided. If native plants needed to be trimmed, they would be trimmed to allow re-sprouting. In addition, the IVM specifies that areas that were cleared would be revegetated—preferably with native species.

With respect to maintenance, HECO's IVM program specifies that woody vegetation that matures to heights greater than 4 feet within 10 feet of poles and guy wires, and all vines within 10 feet of poles and guy wires, must be controlled or removed. All herbicides used for maintenance are commonly available to the public and are approved by the U.S. Environmental Protection Agency for use in watersheds. Extensive research and experience relative to HECO's selective application of extremely low rates of diluted herbicides within its IVM program have demonstrated that this would result in no harm to the environment or to humans. The new poles proposed for this project would be self-supporting and thus would not use

guy wires. Within its easement, HECO manages trees and brush that (1) are capable of growing into the conductors (wires); (2) obstruct physical or visual access to the lines, poles, or equipment; or (3) could fall onto lines or equipment. HECO also controls or removes woody vegetation on or along pathways and access roads within the rights-of-way. No large trees would be removed to construct the proposed action.

A flora survey and report on a pole-by-pole basis were completed in August 1998 to supplement an earlier survey performed in 1993. Section 4.9 of the September 1999 RDEIS summarizes the report, and Appendix E of that RDEIS contains the complete report. There were no listed threatened or endangered plant species and no candidate endangered plant species identified during surveys conducted for the project. No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed action.

The U.S. Fish and Wildlife Service (USFWS) maintains a list of species in different hierarchical categories, including "listed plants" (endangered or threatened), "proposed plants," "candidate plants," and "species of concern." The species of concern designation identifies those species that may be endangered or threatened but for which sufficient data on biological vulnerability or threat are not available to support a designation. Plants designated as species of concern are not entitled to Federal protection.

Three dwarf koa trees (*Acacia koa'*) were found adjacent to the project's easement. Dwarf koa trees are categorized under the "other species of concern" designation. They are readily available from in-state nurseries for purchase and use in replanting efforts. An additional field survey and analysis were performed for the September 1999 RDEIS to address potential impacts to the dwarf koa trees adjacent to the project's easement. The survey also included the area of adjustment 1, an alignment adjustment to the proposed action on lower Waahila Ridge. (See Section 10.A of the September 1999 RDEIS.) That study concluded that the dwarf koa would not be adversely affected during construction because the trees are located about 50 feet away from the nearest pole construction site. During maintenance of the transmission line easement, the dwarf koa will only be trimmed with prior consultation and approval from the State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service.

For more information concerning the potential impact of the proposed action and alternatives on flora, please refer to Section 4.9 of the September 1999 RDEIS.

Where are the one to two staging areas located? How many helicopter landing pads will be constructed within the Conservation District? What is the cleared circumference of each completed pad? Are the helicopter landing pads permanent landing sites? Where and what are the short and long-term impacts of the helicopter landing pads?

Possible construction staging area sites have not been identified. The staging areas can be located anywhere near the general vicinity of the project site. This includes both the Honolulu and Windward sides of the Ko'olau Mountains. In general, HECO would select sites located away from residential areas to reduce any adverse impacts from equipment handling and helicopter operations. There would be no staging areas within the Conservation District. Staging areas are generally existing parking lots or empty lots, which do not need to be cleared. As such, there are no long-term impacts to the staging area following completion of construction activities.

Short term noise impacts associated with construction of the overhead portion of the proposed action would include noise from helicopters. (Heavy dual-blade helicopters at a distance of 1,000 feet can be expected to emit noise within the range of 80 to 90 decibels.) These disturbances would be intermittent and generally of short duration during construction. The public would be notified before helicopter work would commence. Helicopter use would require appropriate operations permits from the Federal Aviation Administration. These permits would include safety standards. The public would be notified of the timing of construction activities prior to the start of construction.

Will the periodic use of herbicides for vegetation removal and on-going maintenance prevent hiking along Waianae Ridge? Since Waianae Ridge is windy, quite how will areas containing native species be protected from wind carried herbicides?

HECO's use of herbicides for vegetation maintenance as part of its integrated vegetation management program will not prevent hiking along Waianae Ridge. HECO already performs similar maintenance for the existing 16-kV transmission lines on Waianae Ridge. In order to protect native species from wind-carried herbicides, HECO directly sprays by hand-held equipment the herbicides on its targeted species. The herbicides used are low-drift agents and spraying is prohibited when winds cause a perceptible drift.

3.4.1.3 Overhead Maintenance Practices

Is the "vegetation management contractor" a licensed position? Is so, what type of license is required? If not, what are the qualifications for the position? What are the qualifications for experienced and trained vegetation management personnel? Are the contractor and personnel required to have expertise in native flora and fauna identification?

There is no defined, specialized license for vegetation management contractors. However, licenses and certificates necessary to perform contracted work are required. For example, CDL driver's licenses are required for operating heavy trucks, a pesticide applicator's license is required for right-of-way herbicide applications, and an International Society of Arboriculture Arborist Certification or equivalent is required for trimming operations.

To be qualified to perform vegetation management operations for HECO, contractors must provide proof of experience and satisfactory performance of the work to be contracted, possess or be able to readily procure the necessary equipment required to effectively and efficiently perform the contracted work, possess the minimum required insurance, and submit reasonably competitive rates.

Vegetation management personnel must be appropriately qualified; experienced and trained for the job to be performed; understand the intent and strategy of HECO's IVM program; be knowledgeable regarding common tree species identification, including native species; and growth characteristics; be knowledgeable regarding IVM program philosophies, management methods and applications; have received first aid training and be certified in CPR on an annual basis; and be capable of complying with HECO's IVM policy, procedures, and specifications. The Contractor General Foreman must produce a certificate identifying each individual as an International Society of Arboriculture Certified Arborist and must possess a certificate identifying the individual as a certified pesticide applicator in category 6—Right-of-Way Pest Control. The supervisor must be knowledgeable with regards to all aspects of the work and possess public relations and language skills such that he is able to effectively communicate with the public, and can effectively supervise contractor crews in order to ensure the satisfactory completion of IVM operations including, but not limited to, ensuring the proper application of herbicides, proper clearances, proper trimming techniques, quality of work, productivity, cleanup, safety, and compliance with HECO's IVM policy, procedures and specifications.

Fig. 4.4.21 Overhead Transmission Lines

What is the cleared circumference required to construct the 5 to 7 foot diameter pole foundations?

HECO's work area around each pole will comprise approximately 400 square feet. However, not all of this area will be cleared. As mentioned elsewhere in this letter, HECO does not anticipate an extensive clearing of vegetation on Waianae Ridge. The proposed action's transmission line poles would be in the same area as the existing 16-kV poles. The transmission line poles for adjustment I would be installed near the Board of Water Supply tanks on Lower Waianae. There are no existing poles in these locations. However, the existing vegetation between the poles of adjustment I are low enough where no trimming would be required. Therefore, it is expected that vegetation disturbance would be restricted to the areas immediately surrounding each pole. Any such disturbance would be in accordance with HECO's current IVM practices. It is possible that some native vegetation would need to be removed to install the new transmission line poles. However, if practical, the removal of native plants would be avoided. If native plants needed to be

trimmed, they would be trimmed in a manner to allow re-sprouting. In addition, the IVM program specifies that areas that are cleared would be revegetated—preferably with native species.

There were no listed threatened or endangered plant species and no candidate endangered plant species identified during surveys conducted for the project. No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed action. The RDEIS states that no long-term impacts on the soils are anticipated but is silent on any immediate or long-term impacts to the environment and flora and fauna. These impacts must be identified.

With respect to the effects of construction and maintenance activities on flora, please see the response above.

With respect to your concerns related to the impact on fauna, during the 1993 and 1998 surveys of wildlife, researchers identified no species within the Conservation District near the existing overhead alignment that are listed by the U.S. Fish and Wildlife Service as endangered or threatened species, or that are proposed species for such listing. The Newell's Shearwater is one the U.S. Fish and Wildlife Service's list of threatened species and this species may occasionally fly over the project site on Waianae Ridge, although there are no known sightings of the bird on Waianae Ridge and no known nesting colonies on Oahu. The O'ahu 'elepaio, a native bird recently listed as an endangered species by the U.S. Fish and Wildlife Service and listed as endangered by the State of Hawaii, has been sighted four times within the last eight years by other persons within two kilometers of the Pihela Substation at elevations over 1,000 feet. The closest portion of the proposed transmission line would be one-half kilometer away from the range of this species. No habitat essential for the survival of the O'ahu 'elepaio was discovered in the vicinity of the alternative alignments.

Installation of the proposed 138-kV transmission line above the existing 46-kV subtransmission line within the Conservation District would increase the height of poles and conductors from the ground. During installation of the poles, some birds would retreat from the area. However, it is expected that they would return following completion of the alignment. The possibility that bats might collide with the transmission conductors while in flight is remote.

It is unlikely that the Hawaiian hoary bat (which may be found in the area) would collide with the transmission poles. Bats navigate principally by using highly developed echolocation systems, which are accurate enough for them to locate, pursue, and catch voles in the dark. Therefore, they are uniquely adapted to avoid collisions with manmade obstacles. It is also unlikely that electric and magnetic fields (EMF) would affect bats. An extensive literature review and contacts with local wildlife scientists failed to find any documentation addressing deleterious EMF effects on bats.

The vegetation in the project area is extremely dense and is dominated by alien species. During construction, the proposed project would involve only minor removal of vegetation potentially used by the O'ahu 'elepaio in the short-term. Revegetation with native species, where appropriate, would mitigate this potential impact. Over the long run, the O'ahu 'elepaio would not be affected by the limited removal of vegetation, the use of herbicides, or EMF. The bird's habitat would not be adversely affected by the project since much better habitat is located above the highest point on Waianae Ridge reached by the project.

The impact of the proposed project on the pūao (owl) would be minimal. Because the poles would extend above the vegetation canopy, there would always be the possibility of collisions. However, the pūao is a diurnal (daytime active) owl, so the likelihood of this occurring would be quite low. The pūao would not be affected by the limited removal of vegetation, the use of herbicides, or EMF.

A survey of invertebrates was conducted in 1999. Land snails (including slugs) were found at all but one of the pole sites surveyed for snails. No listed endangered species (such as the *Achatinella* spp.) were found in the areas around the existing easement and proposed alignment, including adjustment I (an adjustment to the existing action's alignment on lower Waianae Ridge). Present in the lower Waianae Ridge area is the endemic Hawaiian *Succinea cochlea*, a "species of concern," and two species of endemic

Tornatellides (Achatinellidae). The *Succinea edentata* occurred at its greatest abundance around the pole nearest to Dole Street and, therefore, disturbance in this area would be addressed.

In the arthropod samples collected, over 142 species of arthropods were identified, 20 of which (16 percent) are native to the Hawaiian Islands. Alien arthropods were significantly more numerous than native species in all samples, both in numbers of species and individuals. No listed endangered or candidate endangered species was found. A few species apparently new to the Hawaiian Islands were discovered; however, these all appear to be non-native.

Along Wahila Ridge, mobile crane access probably would be available only for poles next to Dole Street (e.g., Pole #26), which is outside the Conservation District. It is anticipated that all other poles along Wahila Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter, only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Wahila Ridge area since the *Succinean edentata*, a species of concern, was found in this area. The biologist will be able to identify the *Succinean edentata* if it is found and make recommendations to the work crews to minimize disturbances. Overall, the majority of the invertebrates recorded are not native to the Hawaiian Islands. However, some native and endemic species were recorded during the survey and, although they are not formally listed as endangered, they should be treated with care. Ongoing vegetation management would probably not differ from current practice and, therefore, any major impacts from future vegetation management are unlikely.

For more information concerning the potential impact of the proposed action and alternatives on fauna, please refer to Section 4.10 of the September 1999 RDEIS.

What are all the methods to be used in excavating rock areas? If blasting is to be used the report must explain how landslides and rock falling will be prevented. The use of silt curtains to retain rocks is unacceptable since silt curtains are often overrun with silt or undermined with water thus rendering them useless.

Construction of the overhead transmission line would begin with surveying, establishing access, and creating construction staging areas. Because of the inaccessibility nature of most of the poles in the Conservation District, foundations would need to be dug by hand, which would require the use of jack hammers. However, if existing access roads are wide enough to permit vehicular access and if risk of vegetation disturbance is minimal, portable drilling equipment might be considered. Blasting methods will not be used by the project.

With respect to the erosion potential associated with construction of the overhead portion of the proposed action along Wahila Ridge, excavation for the poles would require minimal soil disturbance and would be limited to the area immediately surrounding each individual pole. Twenty overhead poles between Dole Street and the Paekela Substation have been identified for replacement. Of those 20 poles, 4 poles are located on 11- to 30-percent slopes and 15 poles are located on 31- to 50-percent slopes and one is located on slopes greater than 50 percent. With respect to adjustment I (an adjustment to the proposed action's alignment on lower Wahila Ridge), 18 new steel poles are proposed. Of those 18 poles, 5 poles are located on 11- to 30-percent slopes and 12 poles are located on 31- to 50-percent slopes, and one is located on slopes greater than 50 percent. Soil types include soils consisting of silty clay and loam over rock or cinders, silty clay and loam over gravelly alluvium, and soils in the classification category of Rock Land established by the U.S. Soil Conservation Service. The poles would have pier foundations with diameters ranging from 5 to 7 feet and depths ranging from 15 to 30 feet. These foundations would be embedded in the rocky ground conditions. Usually, two to three foundations at a time are excavated, formed, and poured, which would require 2 to 3 weeks to complete. The proposed steel poles would be placed in the same general area as the existing wood poles along the 46-kV line. Historically, HECo has not observed any erosion or sliding in the vicinity of the existing poles.

HECo would employ best engineering practices (BEPs) to prevent soil erosion during the construction phase of the project. These BEPs could include the use of portable dikes or sandbags upslope of the

disturbed area around each pole to deflect runoff away from bare soil areas. Silt fences could be placed downslope from each disturbed area to retain any sediment that did run off from disturbed areas. Given existing rainfall and lack of overall topsoil on the ridge, it is highly unlikely that a silt fence could be overrun by topsoil. Given the distance of both Manoa Stream (except by Dole Street) and Pahala Stream from the overhead portion of the proposed project along Wahila Ridge, the existence of intervening roadways and other barriers, or the use of BEPs to contain erosion, it is highly unlikely that siltation of either stream as a result of construction activities along Wahila Ridge could occur.

Following construction, each foundation would be covered with topsoil and replanted with low-growing, native vegetation to remove post-construction erosion potential. Temporary impacts would be eliminated following construction by removing all construction debris and replanting any areas where vegetation had been removed. Siltation collection mats or other erosion prevention barriers could be temporarily installed until disturbed vegetation within the right-of-way recovered. Periodic spot spraying of herbicides is an existing practice within the right-of-way along Wahila Ridge. It is outlined in HECo's IWM program and has been approved by the Department of Land and Natural Resources. The effects of such spraying have not caused any erosion problems or landslides. It is not anticipated that the proposed action would increase herbicide use beyond existing practices. Also, since the surface disturbance from siting transmission poles would be minimal, there would be no permanent changes in absorption rates, drainage, or surface runoff.

Construction of the proposed action would be expected to last about 18 months. Construction would begin as soon as approvals were received.

More information concerning the potential impact of the proposed action and Alternatives with respect to geology is located in Section 4.4 of the September 1999 RDEIS.

4.5.1.1 Conservation District

This section is given on how much construction activity will take place within each of the slope categories. The number, location and types of activities must be identified in the RDEIS as well as the short and long-term impacts to the environment, flora and fauna.

The September 1999 RDEIS shows the location of 4.5, 15 or the 20 poles associated with the proposed slope in Figures 4-4 and 4-5. As shown in Figure 4-5, 15 or the 20 poles designated between 11-30 percent, and one is located on slopes designated greater than 50 percent. With respect to adjustment I (an adjustment to the proposed action's alignment on lower Wahila Ridge), 18 new steel poles are proposed. Of those 18 poles, 5 poles are located on 11- to 30-percent slopes, 12 poles are located on 31- to 50-percent slopes, and one is located on slopes greater than 50 percent. The responses above describe the construction activity in these areas and the potential effects on flora and fauna. As a part of the EIS, all of this information will be considered by the Board of Land and Natural Resources when evaluating the project's compatibility with the Conservation District values. The discussion below describes the various stages of construction (some of the information is repeated from previous responses in this letter).

During construction of overhead transmission lines, most or all of the following phases of work must be accomplished: surveying, establishing access, clearing rights-of-way, establishing construction staging areas, installing foundations and anchors, assembling and installing poles, installing conductors, and cleaning up and removing construction materials. The following contains a summary of these activities (as described in Section 3.4.1.2 of the September 1999 RDEIS) as they relate to the proposed action along Wahila Ridge.

Surveying. Surveying for construction of transmission lines includes property boundary, right-of-way, ground topographical and profile, access road, and construction surveys. In addition, a title search of the property is performed to determine property ownership. A typical survey crew is made up of three individuals: a land surveyor, a transit technician, and a rodman. Geotechnical survey investigations at selected locations would determine the types of foundations required at each pole site. Within the Conservation District, surveying equipment would be either carried into the project site or flown in by helicopter.

Establishing Access. Existing access to the Conservation District is limited to a small road through the Wahila Ridge State Recreation Area and various hiking trails. Many sections of the project areas in the Conservation District contain no service road. Transmission poles and lines in the Conservation District would be constructed and maintained by crews who would access the area either by foot or by helicopter. Access approval would be applied for in those sections of the project where limited vehicular access exists. The use of heavy equipment in some areas of the Conservation District may not be feasible because of the steep grades, lack of access roads, and a high center of gravity that would not allow such equipment to remain upright and operational on steep slopes. In these places, portable equipment (which does not include trucks or heavy equipment) for the digging and backfilling of pole foundations may be flown in and out of the site by helicopter, as necessary.

Clearing Rights-of-Way. HECO uses vegetation-clearing practices designed to minimize environmental impacts and prevent significant erosion. Within the Conservation District, vegetation clearing and maintenance for an overhead 138-kV transmission line would be consistent with HECO's current practices for its overhead 46-kV facilities in service within the Conservation District along Wahila Ridge. Selective tree trimming and vegetation clearing would be restricted to areas required for construction access and would include flora capable of growing into or falling onto transmission lines, poles, or equipment and flora that could restrict access for inspection, maintenance, and repair. Existing roads and trails along the right-of-way would be cleared of woody vegetation that could hinder normal access. Care would be taken to preserve as much of the existing ground cover as practicable. Low-growing vegetation would be preserved and encouraged within the easement to inhibit invasion of undesirable vegetation, to protect against erosion, and to maintain an aesthetically attractive environment.

In most instances, clearing the right-of-way for construction and maintenance of an overhead transmission line would be performed by hand crews using chain and brush saws. Heavy equipment would be restricted from steep slopes where light vegetative ground cover or soil type creates a high erosion potential. On Wahila Ridge, temporary poles may be installed to support existing conductors so that the existing wooden poles can be removed and new steel poles installed in the same general area. In cases where a new steel pole would replace an existing wooden pole in a different location, the existing pole would be removed after the new pole's electrical circuits have been installed. Each temporary pole would be wooden and would generally have the same height and appearance as the existing wooden pole it would replace. The temporary poles would be buried directly into the ground to a depth of six to eight feet. Each pole would remain for about four to six months during the construction period. Removal of wooden poles would generally entail cutting the pole with hand-held equipment, removing the pole by helicopter, digging out the remaining pole segments in the ground, and restoring the site, with soil and vegetation according to HECO's IWM Program.

Establishing Staging Areas. Before construction begins, staging areas would need to be identified in locations near the proposed alignment. No staging areas will be established along Wahila Ridge or within the Conservation District. It is anticipated that one to two staging areas would be required for this project. The construction staging area is typically a fenced area where employees and contractors store and assemble the required project material and equipment. The size of the staging area is dependent upon available space and the needs of the contractor. Employees and contractors may also report to this site at the start and end of each day's activities. This facility often includes one to several field office trailers and is secured at the end of each working day.

The use of helicopters for construction within the Conservation District may also require temporary staging areas between the main staging area and the project site. Placement of these construction staging areas would be coordinated with landowners and appropriate government agencies. No intermediate staging areas would be established in the Conservation District.

Installing Foundations and Anchors. Foundation and anchor installation requires boring a 5- to 7-foot-diameter hole in the ground and placing a reinforced steel cage and anchor bolt cage in the hole. These cages are constructed of steel rebar strategically formed and tied together and placed in the appropriate holes. Due to the inaccessible nature of the pole locations, most foundation holes in the Conservation

District would be dug by hand using jackhammers. Pothole drilling equipment may be used where access roads are wide enough to permit vehicular access and the risk of vegetation disturbance is minimal. Each hole is filled with concrete to a depth of 2 feet below finished grade. While the concrete is curing, backfill is placed and compacted, as necessary, around the foundation. If the holes fill with water during augering or the hole walls are unstable, a corrugated steel culvert pipe is lowered or driven vertically to act as a cylindrical form. Concrete is then tremied into the hole, allowing water to be pumped out for conventional completion of the work. The concrete is allowed to cure for a period of 2 to 4 weeks before the poles are placed on the foundations. After the poles are erected, a 1-foot layer of grout is packed between the steel pole base and the top of the concrete foundation. For directly embedded steel pole foundations, a 5- to 7-foot-diameter hole is drilled or dug by hand to a depth of 15 to 30 feet and then the pole is placed within the hole. Approximately 27 to 34 cubic yards of material would be removed from each hole and discarded offsite at an approved location. Concrete is tremied around the pole and allowed to harden. Topsoil is placed over the hardened concrete and seeded with low-growing, native plants.

Typically, two to three foundations at a time are excavated, formed, and poured, which requires 2 to 3 weeks to complete. If the poles are located next to a roadway, foundation and anchor installation requires closing a single lane of traffic for approximately 1,000 to 1,500 feet. The closed segment of the lane is moved forward to the next set of foundation sites as the foundations are completed.

Assembling and Installing Poles. After the foundation concrete is cured, the poles are transported to the pole locations and assembled and erected. A mobile crane (or helicopter in areas of steep terrain) is used to lift each assembled pole or pole section into place. Along Wahila Ridge, crane access probably would only be available for poles next to Dole Street (e.g., Pole P26). It is anticipated that all other poles along Wahila Ridge would be installed with a helicopter.

The base section of each steel pole is fitted with a baseplate, which has an array of anchor bolt holes matching the anchor bolt pattern installed in the foundation. Anchor bolts are long steel bolts that are used to attach and support the steel pole firmly to the reinforced concrete foundation. Anchor bolt leveling nuts are adjusted to provide a level surface for the baseplate to sit on and anchor bolt securing nuts are then tightened over the baseplate. Pole insulators and framing hardware are assembled and installed on each pole after it is erected. Depending on the available construction space to expedite the installation of the pole, pole insulators and framing hardware may be installed on the pole sections prior to erecting the pole.

Installing Conductors. Before conductors are installed, temporary poles or structures to provide conductor-to-ground or conductor-to-conductor clearances may be installed at selected locations, such as at road crossings and areas where the conductors might inadvertently contact existing electrical or communication facilities, or vehicular traffic during installation. Temporary poles to support existing conductors may also be installed at pole locations where existing wooden poles would be replaced by new steel poles.

Tension-stringing is the method used to install the conductors. This method prevents the conductors from touching the ground or other objects by maintaining a specified tension and sag during the stringing operation. The conductors, the tensioner, the pulley, and other related equipment and material are assembled at predetermined sites located along the alignment. A pulling line, or sock line, which is usually a Dyneema or nylon rope, is pulled from pole to pole through pulleys, also known as sheaves, and attached to the insulator ends. The conductor is then pulled through the sheaves behind the sock line and pulled to the design tension. Once the design tension is achieved, the conductors are secured in the dead-end suspension and horizontal post insulator clamps. Tension-stringing would be accomplished by helicopter in inaccessible areas within the Conservation District. For the overhead alternatives evaluated within the Urban District, one lane would be cleared to traffic during stringing operations adjacent to roadways.

Cleaning Up and Removing Construction Materials. As sections of a transmission line are completed, HECO thoroughly inspects the work to verify that it meets specifications and standards. Anything that does not comply is corrected and re-inspected. Cleanup work generally includes:

- Removing all temporary crossing and clearance poles, structures, and anchors

- Backfilling any remaining holes used for temporary poles and anchors
- Disposing of packing crates, redds, shipping material, and debris
- Dressing roads, work sites, and pole sites to remove ruts, and leveling and preparing areas for seeding, if required
- Repairing gates and fences to restore them to their original condition or better
- Grounding fences and trellises, as needed
- Repairing any damage that occurred during construction, including revegetation

The impacts of these activities as they relate to soils and topography are described in detail in Section 4.4 and 4.5 of the September 1999 RDEIS. A summary of the potential impacts to soils and topography follows:

Soils. Within the saprolite and rock-land soil types of the Conservation District, the overhead alignment alternatives, including the proposed action and adjustment 1, would require support foundations and anchors capable of withstanding groundline loads typical of self-supported steel poles. The pole foundations would most likely be pier foundations with diameters ranging from 5 to 7 feet with depths from 15 to 30 feet. Excavation into the rock may be difficult because of the challenge in mobilizing rock excavation equipment. Foundations for poles within the Conservation District may need to be excavated by hand. Installation of foundations within the Conservation District would minimize soil disturbance during construction and installation by limiting the disturbance to the area immediately surrounding each individual pole. The minimal surface disturbance from siting transmission poles would not significantly change soil absorption rates and, therefore, would not impact existing surface runoff or slope stability conditions. No long term impacts on the soils are anticipated.

Topography. No impacts on the topography of the study area have been identified as a result of construction, installation, or operation of the proposed action, adjustments 1 and 2, or any of the overhead alternative alignments. Disturbed areas would be localized around each pole and all evidence of construction removed following construction. Each pole foundation would be covered with topsoil and the entire construction-affected area planted with native vegetation. Therefore, no mitigation measures would be necessary.

The impacts of construction activities as they relate to flora and fauna are described in detail in Section 4.9 and 4.10 of the September 1999 RDEIS and summarized in a previous response in this letter.

4.6.1.1 Conservation, Urban District

The RDEIS is silent on the presence of any springs within the project area. Are there any underground springs within the proposed Waahila Ridge alignment and urban district that will be disturbed by construction activities and/or permanently degraded or lost if this project is completed as envisioned?

The field survey and research on geological and soil resources, including groundwater, did not identify any underground springs that would be affected by the project.

4.6.2 Overhead Transmission Lines

This section states that the risk and associated impact from the potential of puncturing the caprock and encountering groundwater is "considered small." What constitutes a "small" risk or impact if the caprock is punctured and/or groundwater is encountered? What defines a large impact?

This statement in the September 1999 RDEIS is in reference to the installation of steel poles on the coastal plain, i.e., along streets. This would occur only with the all-overhead alternatives and none of these were selected as the proposed action. Instead, an underground/overhead combination was selected and, as noted in the Section 4.6 of the September 1999 RDEIS, excavation for the underground portion in the coastal

plain area would not be deep enough to encounter caprock. As for the overhead portion on Waahila Ridge, the depth to groundwater is unknown, but is generally considered to be several hundred feet below the ground surface. Thus, there is no reason to expect construction of the proposed action would penetrate the caprock. Construction of the underground portion will encounter groundwater. The difference between a small and large impact would depend on the quantity of groundwater that would need to be discharged during construction, the quality of the discharge and its effect on receiving waters, if any, and whether the effect was of short duration (a few hours or days) or of long duration (years). For the proposed action and its overhead alternatives along streets, the duration of impact, when it occurs, would be of a short duration. With dewatering activities, water removed from the construction area could be either (1) stored in a holding tank and then taken away for disposal on an open field site or (2) pumped into an adjacent trench to allow for natural filtration back into the water table. With either of these measures, the sediment-bearing effluent from dewatering would not be placed into storm drains that are connected to nearby streams or to the Ala Wai Canal.

4.9 Flora

The new language that ko'a populations exist at Ho'omaluhia Botanical Garden, other locations on O'ahu, the neighbor Islands and seedlings can be purchased at nurseries suggests that the loss of these three species within the statement would not be a significant loss if unacceptable. It shows total disregard for any responsibility to protect native species whether endangered or not. The loss of these three trees effectively means that no new ko'a trees will again grow in the area.

HECO does not plan to disturb the ko'a during construction since the closest construction location is Pole P10 at a distance of about 50 feet from the ko'a's canopy. Once construction is completed, HECO will continue to follow its vegetation management practices in this area. Vegetation management practices are already followed along the existing easement over Waahila Ridge in the area of the three individuals of the ko'a in accordance with HECO's IVM program to prevent the accidental contact of vegetation with the conductors. These practices, which would be continued, include tree trimming and encouraging the growth of low, native ground cover within the easement. HECO recognizes the value of the three individuals of ko'a and will minimize any disturbances to the ko'a's as much as possible. However, when trimming is necessary, the existing three individuals of the ko'a will not be trimmed without first consulting with the USFWS and the DLNR.

4.9.1.1 Conservation District

While this section identifies several native trees and shrubs there is no mention on how these species will be impacted by construction and on going maintenance, should the project be built. Will native plants be removed or cut back? If so, how many plants will be affected, what type of plants will be impacted and where are they located? Was a count of existing native species conducted so that there is a data baseline of knowledge by which to evaluate impacts from construction and on-going maintenance activities? Is Waahila Ridge as a whole, or sections considered native flora and/or fauna habitat? If so, what impacts will construction and on-going maintenance have on existing and potential new native habitat?

With respect to your concerns related to vegetation, HECO does not anticipate an extensive clearing of vegetation on Waahila Ridge. The transmission line poles for the proposed action would be in the same general area as the existing 46-kV poles. It is expected that vegetation disturbance would be restricted to the areas immediately surrounding each pole. Any such disturbance would be in accordance with HECO's IVM program. It is possible that some native vegetation would need to be removed to install the new transmission line poles. However, if practical, the removal of native plants would be avoided. If native plants needed to be trimmed, they would be trimmed to allow resprouting. In addition, the IVM specifies that areas that were cleared would be regenerant—preferably with native species.

Some ironwood trees near the Pukela Substation will be removed within the project right-of-way because of the existing 46-kV transmission line. Regardless of the proposed action, these trees will be removed. These trees are not within the Conservation District. No trees are expected to be removed from within the Conservation District, and no large trees would need to be removed as a result of the proposed action.

The area of ground disturbance for the proposed action and overhead alternatives along Washaha Ridge is approximately 400 square feet per pole (none of it permanent), as stated in Section 4.9. The proposed action has 20 poles located in shrub land and/or forest land for approximately 8,000 square feet of disturbance. Adjustment 1 has 18 poles located in shrub land and/or forest land for 7,200 square feet.

All areas of vegetation disturbance on Washaha Ridge would be replanted, preferably with native species. Around Poles P26 to P13 (lower ridge) and the pole locations of adjustment 1, pili grass seeds would be sown on exposed soil or on pockets of exposed soil between rocks. Golden beardgrass, which forms low, creeping mats, could be planted on from plants growing onsite. Golden beardgrass plugs could then be removed from large trays in the nursery prior to starting construction. Golden beardgrass plugs could then be removed from large trays grown in the nursery for replanting the disturbed areas. 'Olei, which forms a low, woody tangle not requiring cutting back, is another good species for replanting disturbed areas. 'Olei seeds would be collected from onsite and then propagated in the nursery. Disturbed areas around Poles P13 to P1 behind the Pukela Substation, should be replanted with introduced Hilo grass or wiedelia.

HECO prefers to use native species for its projects whenever practical and would use native species for the proposed action if it is practical to do so. HECO's IVM program is accepted by the Department of Land and Natural Resources as an appropriate maintenance plan for easements within the Conservation Districts on Oahu. HECO will make maintenance plans available to the public, should it be required as a condition of a Conservation District Use Permit.

With respect to maintenance, HECO's IVM program specifies that woody vegetation that matures to heights greater than 4 feet within 10 feet of poles and guy wires, and all vines within 10 feet of poles and guy wires, must be controlled or removed. All herbicides used for maintenance are commonly available to the public and are approved by the U.S. Environmental Protection Agency for use in watersheds. Extensive research and experience relative to HECO's selective application of extremely low rates of diluted herbicides within its IVM program have demonstrated that this would result in no harm to the environment or to humans. The new poles proposed for this project would be self-supporting and thus would not use guy wires. Within its easement, HECO manages trees and brush (1) that are capable of growing into the conductor (wires); (2) that obstruct physical or visual access to the lines, poles, or equipment; or (3) that could fall onto lines or equipment. HECO also controls or removes woody vegetation on or along pathways and access roads within the rights-of-way.

A flora survey and report on a pole-by-pole basis were completed in August 1998 to supplement an earlier survey performed in 1993. Section 4.9 of the 1999 RDEIS summarizes the report and Appendix B of the RDEIS contains the complete report. There were no listed threatened or endangered vegetation species and no candidate endangered vegetation species identified during surveys conducted for the project. No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed action.

The U.S. Fish and Wildlife Service (USFWS) maintains a list of species in different hierarchical categories, including "listed plants" (endangered or threatened), "proposed plants," "candidate plants," and "species of concern." The species of concern designation identifies those species that may be endangered or threatened but for which sufficient data on biological vulnerability or threat are not available to support a designation. Plants designated as species of concern are not entitled to federal protection.

Three dwarf koa trees (*Acacia koa*'s) were found adjacent to the project's easement. Dwarf koa trees are categorized under the "other species of concern" designation. They are readily available from in-state nurseries for purchase and use in replanting efforts. An additional field survey and analysis were performed for the September 1999 RDEIS to address potential impacts to the dwarf koa trees adjacent to the project's easement. The survey also included the area of adjustment 1, an alignment adjustment to the proposed action on lower Washaha Ridge. (See Section 10-A of the September 1999 RDEIS.) That study concluded that the dwarf koa would not be adversely affected during construction because the trees are located about 50 feet away from the nearest pole construction site. During maintenance of the transmission

line easement, the dwarf koa will only be trimmed with prior consultation and approval from the State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service.

For more information concerning the potential impact of the proposed action and alternatives on flora, please refer to Section 4.9 of the September 1999 RDEIS.

4.9.3 Possible Mitigation

While six of the nine alternatives mention koa's and other native species, mitigation is not discussed for each site but insufficiently. Human erosion control, tree flagging, no removal of large trees (without defining a large tree), plant identification, hand clearing and replanting into a collective solution. This is totally insufficient. Species protection must be discussed for each alternative. A possible mitigation discussed is that "Native plants should be avoided during construction to the extent practicable." The specifications defining "practicable" should be listed. Is replanting using native plants a requirement?

The mitigation measures described in Section 4.9.3 of the RDEIS would apply to those alternatives involving construction of either an overhead or underground transmission line on Washaha Ridge. The alternatives that involve the construction of an overhead transmission line on Washaha Ridge follow essentially the same alignment on Washaha Ridge, and therefore, the mitigation measures that would be used would apply to all such alternatives. The alternatives that involve the construction of an underground transmission line on Washaha Ridge are within the same area as the overhead alternatives and, where available, follow existing access roads, parking lots, and trails. As such, the same mitigation measures would also apply.

Use of native plants is not a requirement. HECO's primary re-vegetation method is natural re-vegetation. That is permitting vegetation to naturally re-establish itself on the site. If natural re-vegetation does not effectively occur in a timely fashion or weather or site conditions cause concerns about short-term erosion, replanting will be performed. Native plants will be used if HECO's system forester identifies native plants that are compatible with the operation of a powerline and that can effectively establish a community on the specific site, if a source of seeds or seedlings at a reasonable cost is available, and if these plants can be installed and maintained such that they can quickly establish and thrive on the site without artificial support.

The term "practicable" refers to the location of the plant such that they are not a physical obstacle to access or construction activities.

4.10 Fauna

While this section identifies several native species, including the listed 'elepaio and 'a'o and endangered 'opeapea within the project area, protection and/or mitigation plans are nonexistent. The RDEIS just states the numbers of species and where the species have been sighted. The only mitigation measure on page 4-42 is to use helicopters during initialisation for most of the poles to minimize ground disturbance and resulting impacts to land snails of interest. Comprehensive and extensive protection and mitigation plans must be defined for each alternative.

With respect to your concerns related to the impact on fauna, during the 1993 and 1998 surveys of wildlife, researchers identified no species within the Conservation District near the existing overhead alignment that are listed by the U.S. Fish and Wildlife Service as endangered or threatened species, or that are proposed species for such listings. The Newell's Shearwater ('a'o) is on the U.S. Fish and Wildlife Service's list of threatened species and this species may occasionally fly over the project site on Washaha Ridge, although there are no known sightings of the bird on Washaha Ridge and no known nesting colonies on Oahu. The Oahu 'elepaio, a native bird recently listed as an endangered species by the U.S. Fish and Wildlife Service and listed as endangered by the State of Hawaii, has been sighted four times within the last eight years by other persons within two kilometers of the Pukela Substation at elevations over 1,000 feet. The closest portion of the proposed transmission line would be one-half kilometer away from the range of this species. No habitat essential for the survival of the Oahu 'elepaio was discovered in the vicinity of the alternative alignments.

Installation of the proposed 138-kV transmission line above the existing 46-kV subtransmission line within the Conservation District would increase the height of poles and conductors from the ground. During installation of the poles, some birds would retreat from the area. However, it is expected that they would return following completion of the alignment. The possibility that birds or bats might collide with the transmission conductors while in flight is remote.

It is unlikely that the Hawaiian hairy bat (the "ope'ape'a", which may be found in the area) would collide with the transmission poles. Bats navigate principally by using highly developed echolocation systems, which are accurate enough for them to locate, pursue, and catch volant insects in the dark. Therefore, they are uniquely adapted to avoid collisions with mammal obstructions. It is also unlikely that electric and magnetic fields (EMF) would affect bats. An extensive literature review and contacts with wildlife scientists in the Islands failed to find any documentation addressing deleterious EMF effects on bats.

The vegetation in the project area is extremely dense and is dominated by alien species. During construction, the proposed project would involve only minor removal of vegetation potentially used by the Oahu 'elepaio in the short-term. Vegetation with native species, where appropriate, would mitigate this potential impact. Over the long run, the Oahu 'elepaio would not be affected by the limited removal of vegetation, the use of herbicides, or EMF. The bird's habitat would not be adversely affected by the project, since much better habitat is located above the highest point on Waahila Ridge reached by the project.

The impact of the proposed project on the pueo (owl) would be minimal. Because the poles would extend above the vegetation canopy, there would always be the possibility of collision. However, the pueo is a diurnal (daytime active) owl, so the likelihood of this occurring would be quite low. The pueo would not be affected by the limited removal of vegetation, the use of herbicides, or EMF.

A survey of invertebrates was conducted in 1999. Land snails (including slugs) were found at all but one of the pole sites surveyed (for arachnids). No listed endangered species (such as the *Achatinella* spp.) were found in the areas around the existing easement and proposed alignment, including adjustment I (an adjustment to the proposed action's alignment on lower Waahila Ridge). Present in the lower Waahila Ridge area is the endemic Hawaiian *Succinea codicula*, a "species of concern," and two species of endemic *Tornatellidae* (*Achatinellidae*). The *Succinea codicula* occurs in its greatest abundance around the pole nearest to Dole Street, and therefore, disturbance in this area would be addressed.

In the arthropod specimens collected, over 142 species of arthropods were identified, 20 of which (16 percent) are native to the Hawaiian Islands. Alien arthropods were significantly more numerous than native species in all samples, both in numbers of species and individuals. No listed endangered or candidate endangered species was found. A few species apparently new to the Hawaiian Islands were discovered; however, these all appear to be non-native.

Along Waahila Ridge, mobile crane access probably would be available only for poles next to Dole Street (e.g., Pole P26), which is outside of the Conservation District. It is anticipated that all other poles along Waahila Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter, only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Waahila Ridge area since the *Succinea codicula*, a species of concern, was found in this area. The biologist will be able to identify the *Succinea codicula* if it is found and make recommendations to the work crews to minimize disturbances. Overall, the majority of the invertebrates recorded are not native to the Hawaiian Islands. However, some native and endemic species were recorded during the survey and, although not formally listed as endangered, they should be treated with care. Ongoing vegetation management would probably not differ from current practice and, therefore, there are unlikely to be any major impacts from future vegetation management.

For more information concerning the potential impact of the proposed action and alternatives on fauna, please refer to Section 4.10 of the September 1999 RDEIS.

It is deceptive to state that construction impacts on the invertebrates will not be great because of the proposed pole installation methodology (mostly by helicopter). This statement completely ignores all necessary ground clearing for access and site preparation. Such impacts must be considered.

The statement that you refer to, shown below, concerning the use of helicopters during pole installation to minimize ground disturbances and impact to *Succinea codicula* is considered to be adequate mitigation, and the U.S. Fish and Wildlife Service has reviewed this mitigation measure.

Along Waahila Ridge, mobile crane access probably would be available only for poles next to Dole Street (e.g., Pole P26), which is outside of the Conservation District. It is anticipated that all other poles along Waahila Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter, only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Waahila Ridge area since the *Succinea codicula*, a species of concern, was found in this area. The biologist will be able to identify the *Succinea codicula* if it is found and make recommendations to the work crews to minimize disturbances. Overall, the majority of the invertebrates recorded are not native to the Hawaiian Islands. However, some native and endemic species were recorded during the survey and, although not formally listed as endangered, they should be treated with care. Ongoing vegetation management would probably not differ from current practice and, therefore, there are unlikely to be any major impacts from future vegetation management.

Was a survey done to assure that the transmission lines and poles along Waahila Ridge will not interfere with the listed Newell Shearwater's flight patterns?

No specific survey was conducted to ensure that the transmission lines and poles along Waahila Ridge will not interfere with the listed Newell's Shearwater's flight patterns. However, the current status of Newell's Shearwater was addressed in supplemental faunal reports, dated August 9, 1999 and May 2000, included in the RDEIS Section 10. "The project's consultant for avifauna, Rana Productions, believes there is enough existing information on the distribution of Newell's Shearwater in the State of Hawaii to render an opinion on any potential impact to the overall species survival that the proposed action on Waahila Ridge may pose. It is also noted that the USFWS commented on the September 1999 RDEIS regarding the Newell's Shearwater and stated that it does not anticipate an adverse impact to this species as a result of the proposed project alternative. This conclusion has been incorporated into the RDEIS."

Existing information available on the Newell's Shearwater recognizes that this species breeds on Kauai and Hawaii, and possibly in extremely small numbers on Oahu and Molokai. Colonies of Newell's Shearwaters have only been found on the Islands of Faau and Hawaii in modern times. Newell's Shearwaters are extremely vulnerable to predation by terrestrial mammalian predators. Their nesting burrows are quite odoriferous, especially when there are young birds present, which makes it easy for cats, rats, mongooses and dogs to find them. The primary cause of mortality is believed to be predation by alien mammalian species at the nesting colonies. A secondary threat, especially to fledgling birds, is being disoriented by lights on their way to the sea. When disoriented, seabirds often collide with man-made structures and, if not killed outright, the dazed or injured birds are easy targets of opportunity for alien mammalian predators. Collision with utility structures is considered by many to be the second most significant cause of seabird mortality in Hawaii.

Newell's Shearwaters nest high in the mountains in burrows excavated under thick vegetation, such as uluhe (*Dicranopteris linearis*). There is no record of, nor is there any suitable nesting habitat for the Newell's Shearwater within the project area and no nesting colonies have been detected to date on Oahu. However, small numbers of this species have been recovered on Oahu following downing incidents. The majority of these downed birds were found on the Hanoholu side of the Koolahau. Thus, it is possible that Newell's Shearwaters may occasionally fly over the site. Since the proposed action would include the installation of taller poles and additional wires than the existing 46-kV subtransmission poles and wires, it is assumed that the potential collision risk to transiting Newell's Shearwaters may be remotely increased. It is also noted that pelagic seabirds that return to land after dark are especially at risk of disorientation and

consequent downing caused by interaction with unshielded external lighting. However, given the low number of Newell's Shearwater that frequent the island of Oahu, the increased threat to the overall species survival, if any, will be minimal. In addition, since no lights are proposed in conjunction with the proposed action, there will be no added risk to the species resulting from additional external lighting. Thus, given the current knowledge of the Newell's Shearwater as summarized above, the potential impacts to the species resulting from this project appear extremely low.

In light of above-referenced information and based upon consultations with the Department of Land and Natural Resources Division of Forestry and Wildlife ("DOFAW"), it is recognized that reasonable surveys attempting to define the distribution of Newell's Shearwater in the general project area would be, at best, inconclusive, and thus, unnecessary.

While the report identifies two locations where the endemic and USFWS species of concern Hawaiian Succinean caerulea (land snail) is found there is no mention of how the snail will be protected from construction activities and on-going maintenance. What are the anticipated impacts to land snails from construction activities and on-going maintenance?

As previously described, because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter (most poles), only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be on site during construction of the poles in the lower Waahila Ridge area since the *Succinean caerulea*, a species of concern, was found in this area. The biologist will be able to identify the *Succinean caerulea* if it is found and make recommendations to the work crews to minimize disturbances.

It is wrong to assert that since the USFWS did not designate critical habitat for the 'elepaio then HECo does not need to address the possibility that Waahila Ridge offers good habitat. How will the endangered 'elepaio be impacted by this project and on going maintenance? Was a survey conducted to identify and location of habitat suitable for the 'elepaio?

In April 2000, the USFWS listed the native species O'ahu 'elepaio as an endangered species under the Federal Endangered Species Act of 1973, as amended ("ESA") (Federal Register, April 18, 2000). In its final rule, the USFWS deemed it prudent to designate Critical Habitat for this species; however, in the rule, the USFWS stated that this task would not be completed until fiscal year 2004 (Federal Register 2000). The species is currently listed as endangered by the State of Hawaii (DLNR, 1998). There have been four documented sightings of O'ahu 'elepaio within two kilometers (or about 1.2 miles) of the Pukela Substation within the last eight years. Two birds were sighted at an elevation of about 1,400 feet above sea level. The northernmost portion of the proposed action is 600 meters (or about 2,000 feet) south of the identified range of this species. It is highly unlikely that an undetected population of O'ahu 'elepaio exists within close proximity to the proposed transmission line.

It is recognized that the limited removal of vegetation at each pole site during construction may affect vegetation that the O'ahu 'elepaio could potentially use for foraging. In the event this species expands its range in the future to include the project area, The O'ahu 'elepaio has demonstrated an ability to use a wide variety of foraging techniques and vegetation substrates. However, no habitat essential for the survival of the O'ahu 'elepaio was discovered in the vicinity of the project alignment. The vegetation in the project area is extremely dense and is dominated by alien species. There is extensive similar habitat located contiguous to the project site, and much better habitat is located above the highest point on Waahila Ridge reached by the project. In addition, the existing habitat found within the easement will not change over the long-term from its current managed state under HECo's IVM program. HECo's IVM program could address any potential impacts of vegetation disturbance by the supplemental planting of native species, where biologically appropriate. As a result, any potential for impact to the O'ahu 'elepaio by this project can be considered remote. This recognizes the fact that the species is not known to reside in the project area, that a powerline easement has long existed in the area, that the vegetation present is dominated by alien species, and that the project's impact to the vegetative cover will occur during construction and end following the restoration of the vegetative cover.

Based on the specifics of the proposed project as discussed above, the recent USFWS listing of the O'ahu 'elepaio does not alter the information presented in the RDEIS and its supporting documents. The fact that the USFWS in their final rule deemed it prudent to designate critical habitat should not impact this project.

4.11 Archaeological and Cultural Resources

This section identifies several sites but fails to discuss how the sites will be impacted or protected from construction activities and on going maintenance and human activity.

Section 4.11.2 of the September 1999 RDEIS is intended to provide a brief discussion on the archaeological and cultural resource studies contained in Appendix G. This section contains a summary of the evaluation of the potential impacts of the proposed project and various alternatives upon both archaeological and cultural resources. Section 4.11.3 of the September 1999 RDEIS also contains a discussion regarding the possible mitigation measures that might be necessary should any as yet unidentified archaeological resources be inadvertently discovered during construction.

In its August 12, 1998 letter to HECo, the State Historic Preservation Officer (SHPO), Department of Land and Natural Resources, indicated "that the proposed alternative will have no effect" on the significant archaeological sites known to be in or adjacent to the project area." It is possible, however, that a significant archaeological site could be inadvertently discovered during construction. The SHPO also indicated that "there are numerous significant historic homes and structures on St. Louis Heights and within Manoa Valley. However, we believe that the preferred alternative is outside the area of potential effect of any known historic archaeological sites."

Regarding cultural impacts, HECo recognizes that the process of assessing cultural impacts is difficult and cultural impact assessment methodology is imprecise. However, based on the comments received during the May 1998 DEIS public comment period, HECo directed Paul H. Rosendahl, Inc., to complete a cultural impact assessment for the project. This assessment evaluated the Native Hawaiian cultural practices and potential traditional cultural property identified as currently associated with Waahila Ridge and assessed the potential impacts of the proposed project. The cultural impact assessment concluded that the construction of the proposed action, which consists of replacing existing subtransmission poles with taller poles within the same area, should have no significant or adverse effect on any existing traditional and customary practices or on the potential traditional cultural property identified as currently associated with Waahila Ridge, with the exception of short-term construction-related impacts. HECo's Integrated Vegetation Management program, with its emphasis on encouragement and planning of native species, could actually be beneficial in supporting cultural practices in gathering vegetation by providing more abundant supplies of native species.

The Assessment of Potential Project Effects states that construction access would be by foot along hiking trails or by helicopter. No modification of existing topography or terrain would be done, yet previous chapters have discussed the need for grading and grubbing for access trails and roads, use of rock excavation equipment, possible blasting, and clearing for helicopter pads and pole sites with a working area of up to 25 feet in width (p. 5-12).

Your comment appears to be describing the large-scale construction techniques required to build an all-underground alternative over Waahila Ridge and might be confusing such impacts with the less intrusive construction methods required to install the proposed action. Because of the inaccessible nature of most of the poles in the Conservation District, foundations would need to be dug by hand, which would require the use of jack hammers. However, if existing access roads are wide enough to permit vehicular access and risk of vegetation disturbance is minimal portable drilling equipment might be considered. Please see the response above concerning construction impacts of the proposed action.

Section Five

While the Coastal Zone Management Area may be the entire State of Hawaii's objectives and policies do not apply to this project because all references are to the shoreline and coastal zone. What is the rational for including HRS 205A in this report?

The purpose of the Hawaii Coastal Zone Management Program (HCZMP) is to establish guidelines for the use, protection, and development of resources in the coastal zone. As designated in HRS Chapter 205A, the coastal zone encompasses the entire State of Hawaii and as such, includes the project area. Development activities in the coastal zone must conform to the HCZMP objectives and policies as outlined in HRS Chapter 205A. When evaluating the merits of a proposed land use, HAR 13-5.30 outlines eight criteria that the Board of Land and Natural Resources (BLNR) shall apply. One of the criteria is how the proposed land use complies with Chapter 205A.

The reference to HRS Chapter 183C must be more specific. A portion of the alignment either goes through the Limited Subzone or it doesn't. Which is it?

A portion of the proposed action will cross the Conservation District Limited Subzone between poles P3 and P4 and in the vicinity of Pole 21/5 as shown in Figure 4-1 of the September 1999 RDEIS.

The RDEIS does not comply with the following relevant sections of the Hawaii's State Plan:

Sec. 226-011 Objectives and policies for the physical environment—land-based shoreline, and marine resources (a)(2) Effective protection of Hawaii's unique and fragile environmental resources, (b)(1) Exercise an overall conservation ethic in the use of Hawaii's natural resources, (3) Take into account the physical attributes of areas when planning the designing activities and habitats native to Hawaii, and (6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.

The subject areas that pertain to portions of Sec. 226-11, 12, 13, and 14 that you cite in this comment and your next three comments were thoroughly considered by HECCO before selecting the proposed action. The following is a summary of the environmental issues discussed in the EIS.

State EIS Rules broadly define the environment to include physical, economic, cultural, and social conditions. The September 1999 RDEIS contains over 20 detailed technical studies related to these areas and covers all the potential environmental effects that were identified during the EIS scoping process for this project. This process took place over a 5 year period and included conducting approximately 200 agencies, elected officials, and interested individuals; conducting three community-wide scoping meetings; and conducting over 150 meetings with neighborhood boards, individuals, and organizations, environmental, social, economic, and engineering concerns. The proposed action is cost-effective compared to all the other transmission line alternatives evaluated because it would have fewer environmental impacts and it would meet all the objectives of the project at a reasonable cost. The discussion below summarizes some of the effects related to the proposed action and alternatives that were examined in the September 1999 RDEIS (some of the information is repeated from previous responses in this letter).

Benefits

The proposed 138-kV transmission line would improve the reliability of electrical service to 54 percent of HECCO's customers and as such provides a benefit to significant portion of Oahu's community, including Manoa and surrounding neighborhoods. The beneficiaries in the service area include residential, business, and institutional (e.g., government and school) customers. For an individual, the benefits of reliable power are numerous. Some examples include the ability to operate electrical appliances at home (lights, televisions, entertainment systems, personal computers, hot water, stove/oven) and the provision of community services such as safe operation of traffic signals.

Runoff and Erosion

With respect to the erosion potential associated with the construction of the overhead portion of the proposed action along Waahila Ridge, excavation for the poles would require minimal soil disturbance and would be limited to the area immediately surrounding each individual pole. Since the surface disturbance from siting transmission poles would be minimal, it would not significantly decrease soil absorption or increase the amount of surface runoff. There would be no permanent changes in absorption rates, drainage, or surface runoff. HECCO would employ BMPs to prevent soil erosion during the construction phase of the project. These BMPs could include the use of portable dikes or sandbags upstream of the disturbed area around each pole to deflect runoff away from bare soil areas. Site forces could be placed downstream from each disturbed area to retain any sediment that does run off from disturbed areas. Given the distance of both Manoa (except by Dole Street) and Palolo Streams from the overhead portion of the proposed project along Waahila Ridge, the existence of intervening roadways and other barriers, or the use of BMPs to contain erosion, it is highly unlikely that siltations of either stream as a result of construction activities along Waahila Ridge could occur.

Water

There is a high water table in the urbanized portion of the project. Therefore dewatering activities would be required during construction of the underground portion of the proposed action within this area. With dewatering activities, water removed from the construction area could be either (1) stored in a holding tank and then taken away for disposal on an open field site or (2) pumped into an adjacent trench to allow for natural filtration back into the water table. With either of these measures, the sediment-bearing effluent from dewatering would not be placed into storm drains that are connected to nearby streams or to the Alia Wai Canal.

Air Quality

Negligible air emissions associated with maintenance vehicles would be produced during operation of the proposed Kamoku-Pukela 138-kV transmission line. These would not add significantly to the existing level of air pollutants within the study area. Minor amounts of fugitive dust emissions would be produced during construction of an overhead alignment during the excavation of foundations. These highly localized dust emissions would be of a short duration and would not result in a significant impact. Construction and operation of a transmission line usually results from a demand for electricity. The construction and operation of a transmission line does not create that additional demand for electric power. Therefore, a transmission line between the Kamoku and Pukela Substations would not directly cause more power to be generated.

Noise Levels

Noise impacts from construction activities would be intermittent and short in duration. Noise impacts at any one location would last only a few days at a time as different phases of construction were completed. Noise associated with construction of the overhead portion of the proposed action would include noise from helicopters. (Heavy dual-blade helicopters at distance of 1,000 feet can be expected to emit noise within the range of 80 to 90 decibels.) These disturbances would be intermittent and generally of short duration during construction. The public would be notified before helicopter work would commence.

Noise associated with the construction of the underground segment of the proposed action and with construction of any of the underground alternatives would occur over a somewhat longer period of time than would noise associated with construction of an overhead alignment. Within the heavily traveled urban corridors, such as Kapiolani Boulevard and University Avenue, it is anticipated that noise levels from construction would be of negligible magnitude. Within Palolo Valley, which has lower existing noise levels, construction-related noise would be more noticeable. However, the short-term and intermittent nature of the noise would not classify it as a significant adverse impact.

No long-term operational noise of consequence is anticipated from any of the overhead alternatives, including the proposed action. During corona activity, transmission lines (primarily 345-kV and above) generate a small amount of audible noise. (Corona is the physical manifestation of energy loss. Energy can be transformed into very small amounts of light, sound, radio noise, chemical reaction, and heat.) Audible noise decreases with distance from the transmission line. This audible noise can barely be heard in fair conditions on the higher voltage transmission lines and is normally not heard at all on 138-kV transmission lines, even in quiet areas. During wet weather, water drops collect on the conductor (wire) and increase corona activity so that a crackling (or buzzing) sound may be heard near the transmission line. The noise is caused by small electrical discharges from the water drops.

It is also possible for a humming noise to be produced by wind flowing past conductors under high wind conditions. However, the addition of three conductors and a shield wire is anticipated to have an insignificant impact on existing noise levels potentially produced during high wind conditions because the placement of the proposed action will be located within the same terrain and have the same orientation relative to wind patterns as the existing subtransmission line alignment.

Noise levels associated with proposed project maintenance are not expected to change from noise levels associated with maintenance of the existing 46-kV subtransmission line on Waahila Ridge because the maintenance procedures are the same. The public would be notified before helicopter work would commence. During project operation and maintenance, helicopters would be used quarterly to inspect and maintain the transmission lines in inaccessible areas. In addition, they would be used to transport vegetation management crews to areas that are inaccessible by vehicle. Helicopters would drop off crews and their equipment at the beginning of the workday and pick them up at the end of the day. These disturbances would generally be intermittent and of short duration.

Noise associated with pumping equipment in the Kamoku Substation would be contained within the building. Noise currently heard from the Pukela Substation is from the fans and, to some extent, transformer humminng. Exhaust and air handling equipment at the Kamoku and Pukela Substations would be designed to meet the specifications of the State of Hawaii rules and regulations for permissible noise. Therefore, no increase in noise generated at the substations would occur with operation of the proposed 138-kV transmission line.

Vegetation

HECO does not anticipate an extensive clearing of vegetation on Waahila Ridge. The proposed action's transmission line poles would be in the same general area as the existing 46-kV poles. Therefore, it is expected that vegetation disturbance would be restricted to the areas immediately surrounding each pole. Any such disturbance would be in accordance with HECO's current Integrated Vegetation Management (IVM) practices. It is possible that some native vegetation would need to be removed to install the new transmission line poles. However, if practical, the removal of native plants would be avoided. If native plants needed to be trimmed, they would be trimmed to allow re-sprouting. In addition, the IVM specifies that areas that are cleared would be re-vegetated—preferably with native species. All herbicides used for maintenance are commonly available to the public and are approved by the U.S. Environmental Protection Agency for use in watersheds. Extensive research and experience relative to HECO's selective application of extremely low rates of diluted herbicides within its IVM program have demonstrated that this would result in no harm to the environment or to humans. HECO recently completed an environmental fate and mobility study of herbicide use on right-of-way in cooperation with the Honolulu Board of Water Supply, Hawaii Department of Agriculture, Hawaii Department of Health, and University of Hawaii. The results of this focal study support HECO's conclusion that its use of herbicides poses no foreseeable risk to groundwater.

There were no listed threatened or endangered plant species and no candidate endangered plant species identified during surveys conducted for the project. No significant adverse impacts to such species, short-term or long-term, would be expected to occur as a result of the proposed action.

The U.S. Fish and Wildlife Service (USFWS) maintains a list of species in different hierarchical categories, including "listed plants" (endangered or threatened), "proposed plants," "candidate plants," and "species of concern." The species of concern identifies those species that may be endangered or threatened but for which sufficient data on biological vulnerability or threat are not available to support a designation. Plants designated as species of concern are not entitled to federal protection.

Three dwarf koa trees (*Acacia koa'*) were found adjacent to the project's easement. Dwarf koa trees are categorized under the "other species of concern" designation. They are readily available from state nurseries for purchase and use in replanting efforts. An additional field survey and analysis of flora were performed for the September 1999 RPE/S to address potential impacts to the dwarf koa trees adjacent to the project's easement. The study concluded that the dwarf koa would not be adversely affected during construction because the trees are located about 50 feet away from the nearest pole construction site. During maintenance of the transmission line easement, the dwarf koa will only be trimmed if necessary with prior consultation and approval from the State Department of Land and Natural Resources and the U.S. Fish and Wildlife Service.

Fauna

With respect to fauna, during the 1993 and 1998 surveys of wildlife, researchers identified no species within the Conservation District near the existing overhead alignment that are listed by the U.S. Fish and Wildlife Service as endangered or threatened species, or that are proposed species for such listings. The Newell's Shearwater is on the U.S. Fish and Wildlife Service's list of threatened species and this species may occasionally fly over the project site on Waahila Ridge, although there are no known sightings of the bird on Waahila Ridge and no known nesting colonies on Oahu. The O'ahu 'elepaio, a native bird recently listed as an endangered species by the U.S. Fish and Wildlife Service and listed as endangered by the State of Hawaii, has been sighted four times within the last eight years by other persons within two kilometers of the Pukela Substation at elevations over 1,000 feet. The closest portion of the proposed transmission line would be one-half kilometer away from the range of this species. No habitat essential for the survival of the O'ahu 'elepaio was discovered in the vicinity of the alternative alignments.

Installation of the proposed 138-kV transmission line above the existing 46-kV subtransmission line within the Conservation District would increase the height of poles and conductors from the ground. During installations of the poles, it is expected that some birds would retreat from the area. However, it is expected that they would return following completion of the alignment.

A survey of invertebrates was conducted in 1999. Land snails (including slugs) were found at all but one of the pole sites surveyed for snails. No listed endangered species (such as the *Achatinella* spp.) were found in the areas around the existing easement and proposed alignment. Present in the lower Waahila Ridge area is the endemic Hawaiian *Succinea cochica*, a "species of concern," and two species of endemic *Tomatellus* (*Achatinellidae*). The *Succinea cochica* occurred at its greatest abundance around the pole nearest to Dole Street and, therefore, disturbance in this area would be addressed.

In the arthropod specimens collected, over 142 species of arthropods were identified, 20 (16 percent) of which are native to the Hawaiian Islands. Alien arthropods were significantly more numerous than native species in all samples, both in numbers of species and individuals. No listed endangered or candidate endangered species was found. A few species apparently new to the Hawaiian Islands were discovered; however, these all appear to be non-native.

Along Waahila Ridge, mobile crane access probably would be available only for poles next to Dole Street (e.g., Pole F26), which is outside of the Conservation District. It is anticipated that all other poles along Waahila Ridge would be installed by helicopter. Because of the proposed pole installation methodology (mostly by helicopter), impacts on the invertebrates related to installation of the new powerline would not be great. For poles installed by helicopter, only the area actually involved in installation around each new pole would be directly impacted. As a precaution, a biologist will be un-

site during construction of the poles in the lower Waahila Ridge area since the *Succinea caducica*, a species of concern, was found in this area. The biologist will be able to identify the *Succinea caducica* if it is found and make recommendations to the work crews to minimize disturbances. Overall, the majority of the invertebrates recorded are not native to the Hawaiian Islands. However, some native and endemic species were recorded during the survey and, although not formally listed as endangered, they should be treated with care. Ongoing vegetation management would probably not differ from current practice and, therefore, there are unlikely to be any major impacts of future vegetation management.

Historic and Cultural Resources

In its August 12, 1998, letter to HECCO, the State Historic Preservation Officer (SHPO) in the Department of Land and Natural Resources indicated "that the proposed alternative will have 'no effect' on the significant Archaeological sites known to be in or adjacent to the project area." It is possible, however, that a significant archaeological site could be inadvertently discovered during construction. The SHPO also indicated that "there are numerous significant historic homes and structures on St. Louis Heights and within Manoa Valley. However, we believe that the preferred alternative is outside the area of potential effect of any known historic architectural sites."

Regarding cultural impacts, HECCO recognizes that the process of assessing cultural impacts is difficult and cultural impact assessment methodology is imprecise. However, based on the comments received during the May 1998 DEIS public comment period, HECCO directed Paul H. Rosenthal, Inc., to complete a cultural impact assessment for the project. This assessment evaluated the Native Hawaiian cultural practices and potential traditional cultural property identified as currently associated with Waahila Ridge and assessed the potential impacts of the proposed project. The cultural impact assessment concluded that the construction of the proposed action, which consists of replacing existing subtransmission poles with taller poles within the same area, should have no significant or adverse effect on any existing traditional and customary practices or on the potential traditional cultural property identified as currently associated with Waahila Ridge, with the exception of short-term construction-related impacts. HECCO's Integrated Vegetation Management program, with its emphasis on encouragement and planting of native species, could actually be beneficial in supporting cultural practices in gathering vegetation by providing more abundant supplies of native species.

Visual Resources

Impacts from the proposed action include impacts to visual resources from the higher transmission line poles proposed along Waahila Ridge. Assessment of vision impacts is a subjective judgment based on individual preferences. The poles associated with the proposed action would not be entirely new visual elements nor would they obstruct existing makai-makai view corridors, panoramic and significant landmark views from public places, or views of natural features. General views that include Waahila Ridge from the H-1 Freeway and views from Tantalus toward Diamond Head are identified in a City and County of Honolulu study, *Oahu Urban Design Guide*, prepared in the early 1980's. Based on an analysis of the Honolulu 1999 RDEIS visual simulations from these vantage points, the proposed project would not substantially affect these two views. The September 1999 RDEIS includes mitigation measures that might minimize the visual impact of the project. Related to poles, these mitigation measures include painting the poles to blend in with the background landscape, planning vegetation in strategic locations to provide a more diverse landscape and reduce the visibility of the poles, and adjusting the pole alignments to minimize the number of poles that traverse the ridgeeline. Related to conductors (wires), the primary mitigation measure would be the use of a male-type finish that would not be reflective in the sunlight and would allow the conductors to blend better with the background vegetation along the ridgeeline.

Social and Economic Development

Since the objective of the project is to provide reliable power to existing service areas rather than to extend service to previously undeveloped areas, the Kamoku-Pukele 138-kV transmission line would

not have a direct growth-inducing effect. The transmission line project is a response to needs identified through planning criteria related to reliability and would serve growth, not cause it. Construction or operation of this transmission line would not have a direct impact on population. By providing reliable electrical energy service, the project would help maintain the viability of the various economic sectors within the service area and would have indirect, beneficial impacts to the local economy.

Tourism

Averse impacts on Oahu's tourism industry are not anticipated from the construction and operation of the proposed action. No tourist destinations within the urbanized area have been identified that would experience disruptions to access as a result of construction. The overhead portion of the proposed action would not be significantly replicable from scenic overlooks and would not significantly detract from the scenic beauty of Waahila Ridge. In addition, views of Diamond Head would not be obstructed from scenic overlooks in the project area.

Property Values

Based on the analysis of the market data, no impacts on property values would be anticipated from the construction and operation of the proposed action. A study on sales data for fee simple and leasehold single-family residential and multi-family condominium projects on Oahu showed that the selling prices of properties adjacent to a 138-kV transmission line were not negatively affected by the transmission line. Adjacent residential properties, regardless of distance from the 138-kV transmission line, showed no difference in price from comparable nonadjacent properties. In a further study of residential properties, those properties with transmission line in their view plane did not show a negative impact on property value relative to comparable properties without a transmission line in their view plane.

Trails and Recreation

Except for some temporary restrictions to access while constructing poles adjacent to trails or in the Waahila Ridge State Recreational Area, no adverse impact to the park or hiking trails would occur because the taller steel poles would be replacing existing wooden poles within the same general area that exists today. Hiking and mountain biking trails in the vicinity of the existing HECCO easement sometimes follow and/or cross the easement for short distances and at other times parallel the easement a small distance away. For safety reasons during construction, parts of the trail on the ridge that are close to pole sites might be closed or temporary detours might be established for a few weeks at a time. To some users of Waahila Ridge, views of the project will diminish their enjoyment of the recreational opportunities.

Traffic

With respect to the proposed action, trench work for the underground transmission line along Kapiolani Boulevard would require that one to two lanes of traffic be closed. However, because the street is sufficiently wide along the project segment, no significant traffic disruption is anticipated. Crossing under the H-1 Freeway at the Kapiolani Boulevard or over the freeway on the Old Wailae Avenue Extension Bridge would not result in the disruption of freeway traffic. During the construction period, portions of the access road within the lower campus adjacent to Rainbow Stadium might need to be closed to traffic. That traffic could be rerouted through the lower campus to the various access gates serving the lower campus.

Additional traffic would not be generated and no long-term impact on traffic or transportation is anticipated. Construction-related traffic disruptions would be of a short duration and are not considered significant.

With respect to the safety concern of vehicles hitting poles, the proposed project is for an underground line within the city streets of urban Honolulu, so there are essentially no changes (impacts) from

existing pole conditions. Several of the alternatives evaluated include overhead transmission line segments along city streets. If any of these alternatives were built, the placement of poles along City and County public rights-of-way would be sited in accord with the respective requirements of the City and County of Honolulu Department of Transportation Services and/or the State Department of Transportation, which review and approve the placement of poles.

Electric and Magnetic Fields

Electric and magnetic fields (EMF) exist in all things that have electricity flowing through them and are found near electrical distribution lines, residential wiring, household appliances, lighting fixtures, and in the workplace. Researchers around the world have pursued, and continue to pursue, the question of whether EMF exposure is hazardous. Summaries of the latest major scientific studies are provided in Section 4.2.1 of the September 1999 RDEIS. These studies address potential health effects on children and adults in residential settings as well as potential effects on adults in occupational settings (e.g., electric utility workers). These studies are inconclusive about whether EMF from transmission lines cause adverse public health impacts.

In 1999, the National Academy of Sciences' National Research Council (NAS/NRC) concluded, "the EMF-RAPID biological research contributed little evidence to support the hypothesis that a link exists between MF [Magnetic Field] and cancer. In view of the negative outcomes of the EMF-RAPID replication studies, it now appears even less likely that MFs in the normal domestic or occupational environment produce important health effects, including cancer." In contrast, the National Institute of Environmental Health Sciences (NIEHS) stated, "the scientific evidence suggesting that ELF-EMF [Extremely Low Frequency EMF] exposures pose any health risk is weak. The lack of consistent, positive findings in animal or mechanistic studies weakens the belief that this association is actually due to EMF, but cannot completely discount the epidemiological findings. [The] NIEHS concludes that ELF-EMF exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard."

HECO has adopted a "prudent avoidance" approach in the planning and environmental evaluation of alternatives. This approach complies with the State Department of Health's "Policy Relating to Electric and Magnetic Fields from Power-Frequency Sources." It means that reasonable, practical, simple, and relatively inexpensive measures are taken to avoid or reduce public exposure to EMF.

Using the prudent avoidance approach, HECO has proposed placing a portion of the line overhead along Waialae Ridge, so that most of the overhead line is well away from residential areas. In addition, HECO has proposed design measures, which would result in a significant decrease in overall magnetic field levels from existing conditions. The addition of the 138-kV transmission line to the existing 16-kV subtransmission lines and reconfiguration of the poles would also be reduced in the residential lots immediately surrounding Pukela Substation because of the magnetic field cancellation effects and the ability to shift some of the electrical load away from the existing 138-kV transmission lines that feed Pukela Substation.

For the XLPE underground portion of the proposed action in the high-density population area, EMF levels would increase over existing levels and would generally be limited to the public rights-of-way. The portion of the underground line through the University of Hawaii lower campus would use existing access roads. EMF levels would increase slightly outside of the access roads, including in the vicinity of the Hale Ilima dormitory.

Impact of Other Transmission Line Alternatives

Of the transmission line alternatives discussed in the September 1999 RDEIS, long term adverse impacts have been identified for the alternatives with an underground alignment along Waialae Ridge. These impacts would be associated with the extensive grading and excavation necessary to bury an alignment across the steep slopes of Waialae Ridge. Impacts to archaeological resources have also been identified for the underground segment of alignments using Dole Street near Kamehameha Field and

the University of Hawaii's Hawaiian Studies Center. Archaeological remains and burials are known to exist in this area, and the potential for disturbance would be great. For more information concerning the topic of the environmental impacts of the proposed action and alternatives as they relate to the proposed Kamokuna-Pukela 138-kV Transmission Line Project, please refer to Section 4.0 of the September 1999 RDEIS.

HECO has had to balance a variety of concerns and objectives, including objectives such as those in the State Plan, in selecting the proposed action. HECO believes it is doing the responsible thing in constructing the proposed action, as described below.

The proposed action would place lines underground in highly urbanized areas and overhead in less populated areas. This decision is the result of HECO's consideration and weighing of a variety of environmental, economic, social, and engineering factors, as well as the project's objectives. HECO believes that the proposed action balances community concerns such as aesthetics with engineering and cost issues.

It should be noted that over the past several years, government decisions on requests to construct transmission lines in the State of Hawaii have defined circumstances in which it would be appropriate to place lines underground and have described how to pay for the underground technology. For an application by Hawaii Electric Light Company (HELCO) to install two overhead 69-kV transmission lines in Punahoa, Public Utilities Commission (PUC) stated in its Decision and Order No. 10620:

"...the cost of placing transmission lines underground is very high and the burden of that cost ultimately falls upon the ratepayers. Thus, unless (1) there is a compelling reason (which outweighs the costs) to place the lines underground or (2) there is a stated public policy requiring the lines to be laid underground or (3) the ratepayers as a whole consent to bear the high cost of putting the lines underground, we do not believe that we should require HELCO to place the transmission lines underground."

With respect to the first circumstance (that is, a compelling reason), the PUC decided that obstruction of a view plane is not sufficient cause to require ratepayers to bear the additional cost of underground utility lines.

Previously, in HECO's application for the Waialae-CIP Part 2 Transmission Lines, the Public Utilities Commission (PUC) recognized that the project would cause visual impacts and public exposure to EMF. However, after lengthy testimony and deliberation, the PUC concluded in its Decision and Order No. 13201:

"Neither of these factors [aesthetics and EMF], however, would justify the underground placement of the transmission lines since aesthetics and as yet inconclusive health effects of EMF do not constitute compelling reasons that would outweigh the added cost of placing the lines underground."

With respect to the second circumstance (stated public policy), HECO has requested, and the PUC has approved, underground transmission lines where public policy requires the placement of transmission lines underground (such as the School Street-Archer Transmission Line, which passes through the Capitol Special District).

For the third circumstance (such as ratepayer consent), the PUC must determine whether ratepayers as a whole (residential, commercial, institutional) would consent to pay the higher cost of underground transmission lines. This question will be resolved when the PUC considers HECO's application, the evaluation factors in Hawaii Revised Statutes (HRS) Section 269-27.6, and other criteria the PUC deems relevant for this project.

HECO has identified, through years of operation, additional circumstances in which it would place transmission lines underground. These additional circumstances include:

- (4) The requester for underground transmission lines pays for the cost differential (including engineering, materials, and construction) between an overhead and an underground system.
- (5) For engineering and operating reasons, HECO cannot construct an overhead transmission line.

- (6) The installed cost for an underground system is comparable to the cost of an overhead line.
- For the fourth circumstance, the ratepayers, as a whole, do not bear the burden of the higher cost of installing underground transmission lines. In the fifth circumstance, overhead lines cannot properly function in an area and, therefore, an underground technology is the only reasonable technology to address the need. For the sixth circumstance, the costs are comparable, so an underground line could be proposed without creating undue cost burdens on the ratepayer.

For more information on the issue of the placement of underground lines, please refer to Section 6.6 of the September 1999 RDEIS.

In addition to alternatives for constructing a 138-kV transmission line, HECO evaluated other alternatives to address reliability issues for the East Oahu Service Area. These alternatives are more fully discussed in Section 3 and Appendices B and C of the September 1999 RDEIS. In summary, these alternatives included demand/conservation alternatives, power generation and storage alternatives, transmission and distribution system alternatives, a no-action alternative, and a deferred action alternative.

With respect to constructing a 138-kV transmission line between the Kamoku and Pukela Substations, HECO formulated, with community input, 11 different alternatives that represented combinations of alignments, configurations, and technologies of overhead and underground lines. The alignments included various roads and rights-of-way between the Kamoku and Pukela Substations. To connect the Kamoku Substation (located at Date and Kamoku Streets) with the Pukela Substation (located at the back of Paliolo Valley), there are only two general transmission line routes that could be used once the line reached the vicinity of Dole Street/Saint Louis Heights—either streets in Paliolo Valley or Waahila Ridge. The configurations included overhead transmission lines, underground transmission lines, and a combination of both overhead and underground transmission lines. The underground technologies included two different types of cable systems: high-pressure fluid-filled pipe (HPFP) cable systems and solid dielectric, cross-linked polyethylene (XLPE) cable systems.

The following 11 transmission line alternatives were evaluated:

- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE combination alternative (proposed action)
- Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-King Street-Lower Campus-Waahila Ridge overhead alternative
- University Avenue-Dole Street-Waahila Ridge overhead alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE underground alternative
- Kapiolani Boulevard-Paliolo Avenue HPFP underground alternative
- Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFP combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge XLPE combination alternative
- Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFP combination alternative

In an evaluation of the transmission line alternatives described in the September 1999 RDEIS, HECO determined that the proposed action would be a combination of underground solid dielectric XLPE cable technology and overhead technology over an alignment following Kapiolani Boulevard-Lower Campus, and Waahila Ridge. The reasons for this preference were that the Kapiolani Boulevard-Lower Campus-Waahila Ridge line.

- Is 28 to 51 percent less costly than the viable all-underground alternatives through Waahila Valley and is comparable in cost to the overhead alternatives.
- Conforms to the preferences of the State Department of Transportation as compared to the University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative) and the Kapiolani Boulevard-Lower Campus-Waahila Ridge overhead alternative.
- Conforms to the preferences of the University of Hawaii as compared to the University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative).
- Minimizes public exposure to electric and magnetic fields (EMF) when compared to the lower-cost overhead alternatives.
- Minimizes visual impacts within the urban area when compared to the lower-cost overhead alternatives.
- Does not place an overhead transmission line within a high-density population area (which the lower-cost overhead alternatives do).
- Does not conflict with future rapid transit projects along University Avenue. The University Avenue-Dole Street-Waahila Ridge overhead alternative (the least-cost alternative) and the University Avenue-King Street-Waahila Ridge overhead alternative would conflict with such projects.
- Requires fewer easement acquisitions than either the Kapiolani Boulevard-Lower Campus-Waahila Ridge HPFP combination alternative or the Kapiolani Boulevard-St. Louis Drive-Waahila Ridge HPFP combination alternative.
- Will not impact known burial sites along Dole Street.
- Produces fewer environmental impacts to Waahila Ridge than the all-underground Waahila Ridge alternatives.
- Will have no significant adverse impact on tourism.
- Will have no significant adverse impact on property values.
- Is more consistent with the stated positions of the neighborhood boards within the study area than the lower-cost overhead alternatives.
- Mitigates potential impacts associated with possible implementation of Revised Ordinances of Honolulu Section 14-22.1. This section includes a requirement to place overhead utilities underground along certain specific streets, including Kapiolani Boulevard, where such streets are improved according to City requirements.

Overall, the proposed action represents a balanced decision based on existing government regulations, past experience in obtaining government permits and approvals, easement acquisition constraints, community inputs, and cost effectiveness. For more information concerning the topic of transmission line technologies as they relate to the proposed Kamoku-Pukela 138-kV Transmission Line Project, please refer to Section 3.0 of the September 1999 RDEIS.

Concerning the need for the project, as mentioned earlier, several studies between 1983 and 2000 addressed the reliability of Hawaiian Electric Company, Inc.'s transmission system island-wide, including the area serviced by the Koolau, Iwilei, School Street, Archer, and Pukela Substations (defined as the East Oahu Service Area). Various alternatives for meeting HECCO's reliability requirements were examined. These studies recommended the construction of an additional transmission line corridor over the southern portion of Oahu connecting power plants in Leeward Oahu to the rest of the Island.

Currently, HECCO transmits bulk power from the Leeward Oahu power plants in the East Oahu Service Area over two major transmission corridors. As described above, the Northern Transmission Corridor extends from the Kaha Power Plant to the Hialawa Substation, to the Koolau Substation, and to the Pukela Substation in Iwilei, where it ends. The Southern Transmission Corridor extends from the Kaha Power Plant to the Waianae Power Plant and the Twilei, School Street, and Archer Substations, ending at the Kamoku Substation. These two major transmission corridors are linked together by transmission lines between the Kaha Power Plant, the Hialawa Substation, and the Waianae Power Plant to form a ring of transmission lines that provides reliable power to the West Oahu Service Area. However, no such connection exists between the Northern and Southern corridors to provide reliable power to the East Oahu Service Area. The proposed Kamoku-Pukela 138-kV Transmission Line would close the gap between the Northern and Southern Transmission Corridors.

By closing this gap with a new transmission line connecting the Kamoku and Pukela Substations, HECCO would be able to:

- Provide a primary benefit by supplying the Pukela Substation with electricity over an entirely separate transmission line corridor, providing an alternative to the existing two transmission lines crossing the Koolau Mountains.
- Prevent overloading of existing circuits to the Koolau Substation (a primary benefit) and to the Iwilei and School Street substations (a secondary benefit), which collectively serve 36 percent of Oahu's electrical load.
- Greatly enhance the reliability and operational flexibility of the 138-kV system by creating a 138-kV transmission system loop serving Windward and East Oahu as a secondary benefit.
- Provide a secondary benefit by supplying additional transmission capacity via an alternative route to meet the projected load growth within the East Oahu Service Area.

The need to close this gap has been recognized by a number of outside agencies including:

1. The PLIC, which recognized the reliability benefits of the line in its Decision & Order No. 12627, Docket No. 7602, issued September 24, 1993: "The new circuit will also provide a third feed to the Pukela substation, the most heavily loaded 138-kV substation in the HECCO system. This will improve system reliability and will ultimately benefit ratepayers."
2. The State Department of Commerce and Consumer Affairs' Division of Consumer Advocacy, which recognized the reliability benefits of the line within its "Consumer Advocate's Amended Statement of Position" to Docket No. 7602, issued on May 3, 1993: "The new 138-kV circuit will also provide a third feed to the Pukela Substation which is the most heavily loaded 138-kV substation on the HECCO system (19 percent of the total system load) via a second and diverse route. This second route will increase system reliability which will ultimately benefit ratepayers."
3. The U.S. Department of Energy's Office of Emergency Management, which recognized the need for the line through its post-Hurricane Iniki Hawaiian Islands Hazard Mitigation Report, in which it made recommendations to "close the radial transmission loops on Oahu." The Kamoku-Pukela line would comply with this recommendation.
4. The State Department of Business, Economic Development & Tourism, which cited the Hawaiian Islands Hazard Mitigation Report recommendation to close Oahu's radial transmission system in

its July 23, 1998, DEIS response letter from its Office of Planning (contained in Appendix N of the September 1999 RDEIS) and indicated that the proposed action would comply with that recommendation.

Providing a new transmission line to connect the Pukela and Kamoku Substations would improve reliability consistent with the findings of these agencies as well as HECCO's standards related to transmission reliability. These standards are also consistent with the Planning Standards of the North American Electric Reliability Council, a non-profit international organization formed in 1968 to promote the reliability of electrical supply for North America.

The Pukela Substation currently services approximately 18 percent of Oahu's electrical load, mainly in the neighborhoods of Manoa, Saint Louis Heights, Palolo, Kahala, Kaimuki, Kapahulu, McCully, Moiliili, and Waikiki. Even though the Pukela Substation serves one of the most important economic areas in the state (Waikiki), HECCO does not have a back-up 138-kV transmission corridor to the Pukela Substation. The two existing transmission lines connect Pukela to the island-wide transmission system via just one substation (the Koolau Substation) and one transmission corridor. These two existing transmission lines are more than 30 years old and traverse the mountainous Ko'olau Range with limited access and constant exposure to high winds and corrosive weather conditions. Failure of either of these transmission lines while the other is out for maintenance would leave the Pukela Substation with no alternate corridor over which to receive electricity from a different substation (that is, the Kamoku Substation). The existing powerlines on Waahila Ridge are 46-kV subtransmission lines that are not sufficient to address the need.

The consequences of not connecting the Kamoku and Pukela Substations with a new 138-kV transmission line are evaluated in the September 1999 RDEIS as the no-action alternative. In that scenario, loss of electricity to the entire Pukela Substation Service Area would occur should the two transmission lines feeding the substation be out of service simultaneously. In addition, continued growth in electrical demand in the East Oahu Service Area would result in the following system problems:

- Overloading of the third 138-kV transmission line to Koolau Substation, when the other two 138-kV transmission lines are out of service, projected in the year 2002
- An overload of the third 138-kV transmission line to the downtown load center, when the other two 138-kV transmission lines are out of service, projected to occur in the year 2016 or by 2005, if the Honolulu Power Plant is retired early

The beneficiaries in the East Oahu Service Area include residential, business, and institutional (e.g., government and school) customers. The Hawaii Public Utilities Commission, with participation by the State's Consumer Advocate, will determine the need for the project and HECCO's rates. No one entity or customer class would unfairly benefit from, or pay for, the project.

Sec. 226-12 Objective and policies for the physical environment—scenic, natural beauty, and historic resources (3) Promote the preservation of views and visits to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features and (5) Encourage the design of developments that complement the natural beauty of the Islands.

Please see our previous response regarding your comment about "relevant sections of the Hawai'i State Plan" for a discussion on how these objectives and policies are addressed.

Sec. 226-13 Objectives and policies for the physical environment—land, air, and water quality. (b)(2)
Promote the proper management of Hawai'i's land and water resources, (6) Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities and (8) Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures, and visitors.

Please see our previous response regarding your comment about "relevant sections of the Hawai'i State Plan" for a discussion on how these objectives and policies are addressed.

Sec. 226-14 Objective and policies for facility systems—In general. (2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.

Please see our previous response regarding your comment about "relevant sections of the Hawai'i State Plan" for a discussion on how these objectives and policies are addressed.

6.4 cumulative Impacts

This section only discusses the cumulative impacts in connection with incremental effects of the proposed action. It is incomplete. The cumulative impacts of all phases of the project, including cumulative impacts to the environment, flora and fauna, must be evaluated for all phases including on-going maintenance.

The cumulative impacts of the proposed project and other alternatives within the project area are addressed contained within Title 11, Chapter 200, Subsection 2, Hawaii Administrative Rules. The discussion in Section 6 of the EIS and are described within the boundaries of the definition for cumulative impacts contained within Title 11, Chapter 200, Subsection 2, Hawaii Administrative Rules. The discussion included an assessment of this project together with other projects as they relate to construction, and long-term impacts, including long-term cumulative impacts to the environment. In Section 4 of the September 1999 RFEIS, impacts of the proposed action are described for all phases of the project, including ongoing maintenance through the integrated vegetation management program.

The types of land uses and population expected in the Primary Urban Core, which could trigger the need for this project, are unknown since the City is now in the process of amending the Primary Urban Core Development Plan which will identify land uses and subsequent population increases/decreases.

The need for this project is not dependent on the City & County of Honolulu Primary Urban Center Development Plan. The need for the project is determined by other factors described in a previous response in this letter.

Addressing the reliability of the Pukela Substation is an important need and primary benefit of the project. HECCO defines reliability as the availability and continuity of electric service. HECCO's rate-paying customers, represented by the Consumer Advocate during proceedings with the Public Utilities Commission (PUC), were involved in defining reliability.

HECCO's standards related to reliability are consistent with the Planning Standards of the North American Electric Reliability Council (NERC), a non-profit international organization formed in 1968 to promote the reliability of electrical supply for North America. NERC establishes policies, standards, principles, and guides to help electric utilities provide reliable service. The NERC defines reliability as:

The ability of the electric systems to supply the aggregate electrical demand and energy requirements of their customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements. Transmission capacity must be available on the interconnected transmission systems to provide flexibility to handle the shift in facility loadings caused by the maintenance of generation and transmission equipment, the forced outages of such equipment, and a wider range of other system variable conditions, such as construction delays, higher than expected customer demands, and generating unit fuel shortages.

It must be noted that this definition addresses reliability standards for the mainland, which are interconnected systems (that is, transmission systems of different power companies are connected with each other across the states). Because Hawaii does not have interconnected systems but, instead, has systems that are not connected to other electric utilities, it could be argued that Hawaii standards should be more conservative—that is, provide more redundancy—than NERC standards.

After the 1983 blackout, a report by Stone and Webster (*Investigation of July 13, 1983 Blackout, 1984*) evaluated system reliability. The report recommended a second, southern transmission line corridor to deliver bulk power from generating plants in West Oahu to the load centers in East Oahu along an alternate route to the northern corridor. (As described above, the Northern Transmission Corridor extends from the Kaha Power Plant to the Halaawa Substation, to the Koolau Substation, and to the Pukela Substation, where

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII



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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

REF LM JGD

AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

MAY 30 1996

TO: Dean Y. Uchida, Administrator
Land Division
John Dooling
FROM: John Dooling
Oahu Land Agent *CBS*
SUBJECT: Request for Comments, Hawaiian Electric Company's
Application for a Conservation District Use Application
for the 46 KV Subtransmission Line Between the Existing
Waialua and Kuilima Substations

The Oahu District Office of Land Management still prefers that the applicant utilize the alternate A1 coastal underground alignment as presented in the as we had formerly commented by our memorandum of February 26, 1996.

As proposed in the Conservation District Use Application, the applicant plans to utilize the mauka route traversing State-owned lands at Pupukea-Paumalu, Koolauloa, Oahu, TMK: 1st/ 5-9-06:26 encumbered by General Lease No. S-3850 to the United States Army for a training area. As such, we request the applicant address the United States Army for comments on the proposed project and adhere strictly to their comments.

We feel that the 46 KV subtransmission line should be laid underground for obvious purposes such as mitigating adverse effects on the Conservation, Agricultural and Urban lands that it traverses.

We request that the applicant comply with all findings in the Final Impact Statement and that the applicant obtain all required permits from the appropriate Federal, State and County agencies prior to any construction work.

Additionally, the applicant must apply to this office for a right-of-entry to State-owned lands utilized within the project area and supply to this office the appropriate metes and bounds survey description of easement areas on any State-owned lands on which the proposed easement is located.

STATE OF HAWAII
Department of Land and Natural Resources
Land Division
Planning and Technical Services Branch
Honolulu, Hawaii

File No.: OA-2807
Acceptance Date: 3/19/96
180-Day Exp. Date: 9/15/96

August 23, 1996

Board of Land and
Natural Resources
State of Hawaii
Honolulu, Hawaii

REGARDING: Conservation District Use Application to Construct a 46 kV Electrical Subtransmission Line from Waialua to Kuilima, North Shore, Oahu

APPLICANT: Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

AGENT: Dames & Moore
1050 Queen Street # 204
Honolulu, Hawaii 96814

LANDOWNERS: Kamehameha Schools/Bishop Estate, Castle & Cooke Land Company, Attractions Hawaii, State of Hawaii

LOCATION/
TMKs: North Shore, Oahu, Hawaii
5-9-06:26; 6-1-02:02; 6-1-06:01; 6-2-08:16;
6-2-08:25; 6-2-09:01; 6-2-10:01

AREA OF USE: Approximately 18,000 lineal feet x 50' wide in the Conservation District (23 percent of total length) = 21.6 Acres.

POLE HEIGHT: From 34 to 88 feet high

SUBZONE: Limited, Resource, General

DESCRIPTION OF AREA/CURRENT USE:

The project site is located on the North Shore of the Island of Oahu and covers mostly mauka lands from Waialua town to Kuilima (Exhibits 1-3). The project spans a distance of approximately 15.4 miles, but only 23 percent of the project occurs within the Conservation District. Portions of the project are located within the Limited, Resource and General subzones (Exhibits 4-5).

Topography and Soils:

Topography within the project study area varies greatly. It ranges from uplands along the slopes of the Koolaus, deeply dissected by many intermittent streams, to moderately sloping agricultural lands at the low to mid elevations and to the flat coastal plain and sandy beach areas. Slopes of 30 percent or more are found in the cliff and valley areas of the Koolau Range. At valley heads and within lands bordering the coastal plains, steep slopes of 21 to 30 percent as well as flatter slopes of 11 to 20 percent are found.

The terrain within the Conservation District Portions of the project is more rugged. Elevations at Anahulu Gulch range from 300-400 feet at the proposed subtransmission crossing and between 800-1000 feet within the Waimea Valley area and the Pupukea Forest Reserve.

There are primarily three soil associations that are present within Conservation area, identified by the U.S. Department of Agriculture Soil Conservation Service: Helemano-Wahiawa, Rough mountainous land-Kapaa and Lolekaa-Waikane. The Helemano series are generally well drained soils with moderate slopes. The Kapaa series are well drained with very steep slopes and the Lolekaa series are level well drained soils. Actual soil conditions may vary significantly from site to site.

Hydrology and Drainage:

According to the project consultants, the major water features within the project study area include Waimea Stream, Anahulu Stream, Paukaula Stream, Ioko Ea Pond, Ukoa Pond and Kalou Marsh. The subtransmission line would span the following streams from north to south: Paumalu, Kalekeiki, Pakulena, Kalunawaikaala, Elehala, Kamananui, Kaiwikoel, Anahulu and Opaeula. According to the applicant, poles would be sited outside stream channels, thus, dredging or filling actions will not be required.

Flora/Fauna:

Botanical field studies within the Conservation District were conducted in 1995.

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According to the applicant, there are a wide range of plants that can be found within the project area. Vegetation in the Anahulu Gulch area consists of Koa-haole/Guinea grass scrub and large stands of ironwood and Java Plum trees. The vegetation of the ridges being Waimea and Pupukea consists of mixed mesic forest. The most abundant native trees are koa and 'ohi'a. Introduced trees include large blocks of forestry plantings of various eucalyptus species, ironwood and paperbark. Strawberry guava forms a dense thicket in many places along the ridge tops. The more open, sunny areas along the ridges support grassy knolls or dense mats of uluhe fern.

According to the applicant, no listed, proposed, or candidate threatened and endangered plants, or any rare and vulnerable plants were found during the field studies. However, the nioi is a listed endangered species that is known to exist in the general area. It is, however, associated with the somewhat wetter and more protected gulch and lower slopes areas, according to the project consultants.

A variety of mammals are known to occur in the study area. These include feral pigs, feral cats, feral dogs, mongooses, rats and mice, as well as domestic cattle. The northern part of the Koolau Range is wet and provides a favorable environment for wild pigs.

Birds found in the agricultural areas include the cardinal, barred and spotted doves, mockingbird, golden plover, Hawaii Owl (pueo), rice bird, house sparrow, ring neck pheasant, egret, seabirds and white eye. Endangered bird species found in the study area include: Hawaiian Coot, Hawaiian Duck, Hawaii Gallinule and Hawaiian Stilt.

Tree Snails:

Malacological surveys were conducted along the proposed alignment to search for evidence of snails, particularly the endangered and threatened Hawaiian tree snail. Stands of native vegetation (which provide good habitat for Hawaiian tree snails), mixed with introduced trees, were found along the ridges in the upper Waimea area within the Conservation District. Anahulu Gulch was not thoroughly surveyed as the area surrounding and within it does not contain the types of native vegetation that sustain native Hawaiian tree snails.

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Archaeology:

According to the applicant, the project alignment within the Conservation District portion contains no archaeological or significant historic sites.

Existing Utilities:

There is an existing 46 kV subtransmission line that links Waialua, Waimea and Kuilima. This line follows the coastal bluff area along the North Shore of Oahu, ranging from close to sea level to a 200 foot elevation. The line is several 100 feet mauka of Kamehameha Highway. In addition, 12 kV and 4 kV lines are located in the DOT highway right-of-way along Kamehameha Highway.

Access:

Existing access to the proposed project alignment within the Conservation District is limited. Where there is no adequate vehicular access in the Conservation District, helicopters will be used for project construction and maintenance.

PROPOSED USE:

Hawaiian Electric Company, Inc. (HECO) proposes to install a new single-circuit 46 kV subtransmission line between its existing Waialua and Kuilima substations on the North Shore of the island of Oahu (See Exhibits 2-3). The purpose of the new line is to achieve the following: 1) maintain reliable electrical service to the North Shore of Oahu by correcting low voltage conditions; 2) provide an alternative subtransmission line that can provide service in the event of failure of the existing 46 kV line; and 3) provide additional transmission capacity to meet the growing demands of existing customers and to accommodate projected load growth along Oahu's North Shore.

load

The subtransmission line easement would be approximately 15.4 miles long by 50' wide. 3.4 miles of the line would pass through the Conservation District.

The new line would begin at the Waialua Substation, which is on the edge of Haleiwa, and terminate at the Kuilima Substation, two miles west of Kahuku.

The proposed subtransmission line would pass through Conservation District lands at two different locations and would impact the Limited, Resource and General subzones. The first area is a 2,660

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foot section through Anahulu Gulch. The second area is a 16,140 foot section above Waimea Valley which continues into and through the Pupukea Forest Reserve. The total distance of the line within the Conservation District represents approximately 23 percent of the entire 15.4-mile length of the proposed line.

The project would utilize single steel poles with above ground heights between 34 and 88 feet depending on ground clearances, vegetation and span-length requirements. The steel poles would be spaced approximately 600 to 650 feet apart and would support three single conductors mounted on insulators (Exhibit 6).

In addition, H-frame steel pole structures would be used for gulch crossings where extended spans between support structures dictate the need for additional support. The maximum height of an H-frame structure would be 52 feet and would have an average span of 1,000 feet and a maximum span of 2,300 feet between each structure (See Exhibit 6).

Construction Methods:

Installation would involve surveying, equipment mobilization, clearing and alignment preparation, excavation of foundations, pole erection and installation of conductors. The steel pole structures would require hole widths of 3-4 feet with a maximum depth of 15 feet. For portions of the route accessible by vehicle, poles would be erected by a mobile crane. Spur roads up to 100 feet long may need to be constructed where terrain and vegetation allow. Spur roads must be 12 to 15 feet wide, roughly graded, passable by four-wheel drive vehicles, but need not be completely cleared of low vegetation. In areas heavily vegetated with trees and shrubs, an additional 10 to 15 feet along one side of the road would need to be cleared for framing and setting the poles. In remote areas and areas inaccessible to vehicles, helicopters would be used to erect poles and to install conductors. No staging area would be located within the Conservation District.

Right-of-Way Vegetation Clearing and Management Program:

Clearing would be restricted to the removal of trees that are capable of growing into or falling onto lines, poles or equipment and vegetation that restricts access for inspection, maintenance and repair.

Trees would be cut so that the stumps remain in the ground to minimize disruption and erosion. Logs, large limbs and brush from the clearing operation would be bucked and scattered on the site. In most instances, clearing would be performed by hand crews using

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chain and brush saws. Heavy equipment would be restricted from steep slopes where there exists a potential for erosion.

Herbicides would be used to inhibit regeneration of undesirable vegetation.

Periodically, on a one to two year cycle, undesirable vegetation must be selectively removed to protect the system. Right-of-way vegetation management operations would be conducted according to Integrated Pest Management (IPM) practices. This program consists of prescription hand cutting (using chain and brush saws), mowing, and/or the controlled, selective application of dilute herbicide solutions to inhibit the growth of undesirable vegetation.

Access for maintenance crews to remote sites that are not accessible by roads or trails would be by helicopter drop.

AGENCY COMMENTS:

The application was referred to the following agencies to solicit comments: The Department of Land and Natural Resources Divisions of Aquatic Resources, Forestry and Wildlife, Conservation and Resources Enforcement, State Parks, Oahu Land Agent, Engineering Branch, Water Commission and Historic Preservation; Department of Health, Office of Hawaiian Affairs, Department of Hawaii Home Lands, Office of Environmental Quality Control, Office of State Planning, Department of Transportation, Department of Business, Economic Development & Tourism; City and County of Honolulu, Planning Department, Department of Land Utilization, Department of Public Works, Department of Parks and Recreation and Board of Water Supply; U.S. Fish and Wildlife Service.

The application was also sent to the North Shore Neighborhood Board. Comments are as follows.

DEPARTMENT OF LAND AND NATURAL RESOURCES

Historic Preservation Division:

We believe that the portion of this project within the Conservation District will have "no effect" on historic sites.

However, we are awaiting an inventory survey report for the entire project, including lands outside of the Conservation District and recommend that any approved permit carry the following condition.

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The applicant shall submit an acceptable archaeological inventory survey report for the entire Waialua-Kuiliwa 46kV Subtransmission Line Project to the Historic Preservation Division prior to the initiation of construction activities.

Division of Forestry and Wildlife:

After reviewing the proposed alignment and the Botanical Assessment, we do not have a problem with the designated route. However, a portion of the transmission line comes fairly close to a known population of threatened and endangered plants (*Nioi*). It is recommended that a botanist be on site when the project commences.

Consideration should be provided for fire contingency while in operation. Debris created by the project should be chipped and spread in the area to reduce heavy fuel loading.

Oahu Land Agent:

The Oahu District Office of the Land Management still prefers that the applicant utilize the alternative A1 coastal underground alignment as presented in the EIS and as we had formally commented by our memorandum of February 26, 1996.

As proposed in the Conservation District Use Application, the applicant plans to utilize the mauka route traversing State-owned lands at Pupukea-Paumalu, Koolauloa, Oahu, TMK: 5-9-06:26 encumbered by General Lease No. S-3850 to the United States of Army for a training area. As such, we request the applicant address the United States Army for comments on the proposed project and adhere strictly to their comments.

We feel that the 46kV subtransmission line should be laid underground for obvious purposes such as mitigating adverse effects on the Conservation, Agricultural and Urban lands that it traverses.

We request that the applicant comply with all of the findings in the EIS and that the applicant obtain all required permits from the appropriate Federal, State and County agencies prior to any construction work.

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Additionally, the applicant must apply for a right-of-entry to State-owned lands utilized within the project area and supply to this office the appropriate metes and bounds survey description of easement areas on any State-owned lands on which the proposed easement is located.

DEPARTMENT OF TRANSPORTATION

1. The project alignment of the 46kV transmission line through lands in the Conservation District will not impact our State highways.
2. Construction plans for work within our State highway right-of-way must be submitted for our review and approval. This applies in particular to the proposed alignment placing underground and overhead sections of the transmission utility line along the Kamehameha Highway and Kaukonahua Road right-of-way in the vicinity of the Waialua Substation Weed Circle. Design details for the underground conduit and crossing points must be incorporated in the design plans.
3. There is an existing overhead line on wooded utility poles running along Kamehameha Highway from Weed Circle to a Board of Water Supply water tank that corresponds to part of the overhead portion of the proposed alignment of the 46kV line. To mitigate visual impacts, the existing overhead line should be moved to the 46kV circuit's steel poles and the wooden utility poles removed. (Note: We would have preferred that both circuits be placed underground to improve the view plane and traffic safety.)

DEPARTMENT OF HEALTH

With regards to the EMF which could be generated by this electric power line, Hawaiian Electric Company (HECO) appears to have considered minimizing human exposure.

CITY AND COUNTY OF HONOLULU

Board of Water Supply:

We have no objections to the proposed project; however, the project design should be coordinated with our Planning and Engineering Division to ensure that there will be no conflicts with existing water facilities.

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U.S. FISH AND WILDLIFE SERVICE

Hawaiian Electric has committed to having a botanist accompany the field crew when the final power pole sites and helicopter landing pads have been selected to ensure that no accidental clearing of rare or endangered plants occur. Because of the limited nature of the impacts and the ability of avoid impacting rare or endangered plants through botanical surveys, the Service does not anticipate any significant negative impacts to the environment or fish and wildlife resources in the project area.

ANALYSIS:

Following review and acceptance of the application for processing, Hawaiian Electric Company, Inc. (HECO), by letter dated April 4, 1996, was notified that:

1. The proposed use is an identified Public Purpose use in the Limited, Resource and General subzones of the Conservation District according to Administrative Rules, Title 13, Chapter 5;
2. A public hearing is not required in that the proposed use is not of a commercial nature according to Section 13-5-2, HAR; and
3. In conformance with Title 11, Chapter 200, of the Administrative Rules, a Final Environmental Impact Statement for the project was accepted by the City and County of Honolulu, Department of Land Utilization in August, 1993.

The objective of the Limited subzone is to limit uses where natural conditions suggest constraints on human activities.

The objective of the Resource subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

The objective of the General subzone is to designate open space where specific conservation uses may not be defined, but where urban use would be premature.

Section 13-2-21 of the Administrative Rules states that all applications shall be reviewed in such a manner that the objective of the subzone is given primary consideration.

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According to HECO, a Special Management Area Use Minor Permit was approved by City and County of Honolulu, Department of Land Utilization for the project on July 4, 1995.

ENVIRONMENTAL IMPACT STATEMENT REVIEW PROCESS (EIS):

An EIS for the project was accepted by the City and County of Honolulu, Department of Land Utilization (DLU) on October 7, 1993. Based on the results of the routing study (completed on August 1993), the EIS was written for a preferred alternative (mid-level mauka) as previously identified in Exhibits 2-3. The EIS discusses the affected environment, impacts and mitigation measures, project relationships to land use plans, policies, controls and alternatives. The EIS also documents public involvement.

MODIFICATION OF PREFERRED ALIGNMENT:

Subsequent to the DLU's acceptance of the final EIS, the preferred project alignment was modified to accommodate concerns regarding visual impacts, raised by the owners of Waimea Valley Park. The system was realigned from 2,000 to 5,000 feet further mauka of Waimea Falls (See Exhibit 3). There were other Post-EIS modifications, but they occurred out-side of the Conservation District.

This alignment modification was deemed to be within the scope of the FEIS study per the DLU's April 23, 1996 determination. Although the modification occurred within the Conservation District area (which is outside of DLU's area of jurisdiction), DLU affirmed the change because they were the original accepting authority of the EIS. Their determination was supported by additional field surveys conducted by the applicant along the realignment portion of the project. DLNR staff concurred with DLU's determination that a supplemental EIS would not be required.

ROUTE SELECTION PROCESS:

According to HECO, the alignment for the subtransmission line was largely determined through a route selection process which involved extensive technical research, agency consultation, community involvement and landowner negotiation. In addition, the sensitivity of the Conservation District was considered a primary routing constraint at each step of the selection process. The process began with the selection of nine 1,500-foot wide alternative corridors (Exhibit 7). The following parameters were used in establishing corridors from the multitude of possibilities:

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- Minimize Conservation District impacts
- Minimize Special Management Area impacts
- Avoid military zones
- Minimize number of angles and long spans
- Maximize ease of access for construction, maintenance, and repair
- Minimize easement acquisition
- Minimize fragmentation of property
- Maintain separation from existing 46 KV lines
- Minimize route length
- Minimize disturbance to agricultural lands
- Avoid, to the greatest extent possible, built-up areas
- Minimize construction costs
- Minimize natural disaster risks

According to HECO, a major limiting factor in rout selection was the environmental and aesthetic sensitivity of Conservation District land. Selection factors were also based on construction cost and engineering, environmental and community concerns and permitting. HECO prepared a weighted Composite Sensitivity Analysis comparing the results of the environmental/land use and engineering/cost sensitivity analysis for six alternatives including a coastal underground alternative (Exhibit 8).

Upon review of the alternatives analysis contained in the Routing Report, it appears that the underground coastal alternative ranked the highest, in terms of environmental sensitivity, of the six alternatives analyzed. However, the underground alignment ranked the lowest on the engineering and cost sensitivity analysis, due to high costs associated with "construction" and "relocation" of an underground system. This tended to make the coastal underground alternative appear unfavorable. The Kamehameha Highway overhead alignment ranked the highest of the alternatives compared in the Composite Sensitivity Analysis, but was not chosen due primarily to community concerns with respect to potential impacts on coastal views, traffic accidents (vehicles striking poles), electromagnetic fields (EMF) and exposure of the system to flooding or tsunamis and slightly higher construction costs.

The alignment that was chosen was the mid-level mauka alignment (See Exhibits 2-3). This alignment would involve the use of Conservation District land at Anahulu Gulch, upper-upper Waimea Valley and the Pupukea Forest Reserve. According to HECO, this route was chosen over a coastal route (underground/overhead along Kamehameha Highway) due to lower cost and general community acceptance. A mid-level makai alignment through Waimea Valley makai of Waimea Falls and through the Pupukea community ranked

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second best behind the Kamehameha Highway overhead alignment, but was also rejected due to visual impacts and community concerns.

Staff initially questioned construction costs estimates in the Routing Report/FEIS for the preferred mid-level mauka alignment. The cost of the system was represented to be \$8.2 million, excluding easement acquisition costs. The cost of the Kamehameha Highway overhead alignment was estimated at \$10.1 million. However, the length of the mid-level mauka alignment was increased by almost two miles subsequent to the completion of the FEIS/Routing Report, thus increasing construction and maintenance costs associated with the system. Staff contacted HECO to obtain more recent cost estimates for the mid-level mauka alignment. At that time, HECO represented that the total cost, including easement acquisition costs, would be \$12.16 million. The cost of the underground coastal route was estimated to be \$40.6 million or roughly 3.3 times more expensive than the mid-level mauka alignment.

Because of continuing concerns over project costs, staff met with representatives of HECO on August 14, 1996. HECO also submitted written materials including project cost estimates for the mid-level mauka system and the coastal underground system. Updated cost estimates were not submitted for the Kamehameha Highway overhead alignment. HECO estimated construction, materials, and survey costs per mile for the project. (Note: These cost projections did not include easement costs, engineering and planning costs.) According to HECO, the per mile cost for the 46 kV underground system along Kamehameha Highway would be approximately \$2.5 million assuming that existing underground utilities were minimal. This system requires a 2 x 4.5 foot trench with four PVC conduits enclosing three polyethylene cables, all placed in concrete (Exhibit 9). Also, manholes would need to be constructed at 600 or 1,000 foot intervals to allow for access to the system for cable splicing. For the overhead mauka system, the cost per mile would be approximately \$450,000. Total cost including construction, materials and survey costs for the overhead mid-level mauka system (excluding easement costs, engineering and planning costs), would be \$6,729,200 and \$32,250.00 for the underground system. This is a difference of approximately \$25.5 million. In estimating the cost of an underground system, staff does not know if HECO recently contacted cable manufactures and construction companies to ascertain the cost per unit of an underground system based on existing conditions along Kamehameha Highway.

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In terms of maintenance cost, HECO estimates that the mid-level mauka system would cost \$20,636 per year, or over \$1,000.000 over the estimated 50 year life of the system (Note: This estimate does not include cost associated with damage of the system from natural disasters or other sources.) Maintenance of an underground system along Kamehameha Highway would be \$2,190 per year or over \$100,000 over a 50 year period. However, HECO notes that the underground cable would need to be replaced after 30 years due to deterioration of the cable insulation.

UNDERGROUND UTILITY LINES vs. OVERHEAD LINES:

The placement of electrical transmission lines underground has traditionally been considered cost prohibitive by the industry. In terms of initial construction costs, this may be true. However, the long-term maintenance cost associated with overhead lines as compared to underground lines is not well established in Hawaii, as the vast majority of large circuit lines are overhead. However, there are some obvious benefits to underground lines as opposed to overhead lines.

1. Overhead lines are more vulnerable to damage from the effects of high winds and hurricanes. Damage to overhead lines on the island of Kauai from Hurricane Iniki probably cost millions of dollars. In fact, HECO is trying to address this problem by upgrading their pole specifications to withstand higher loads imposed by winds and flooding (See Exhibit 10). The poles for Waialua to Kuilima system are designed to withstand winds of 80 mph. However, wind velocities are generally higher in mountain and canyon areas which is where portions of the mid-level mauka route are planned. This would tend to increase the risk of failure from hurricanes and high winds. In addition, in the case of a failure, access for repair of the system would be much more difficult.
2. Overhead lines are unsightly, and if not sited properly, can lead to negative externalities associated with view shed impacts. Because Hawaii's economy is largely supported by the beauty and visibility of its natural resources, this is of great concern and importance. In addition, preservation of scenic views is an explicit policy of General Plan for the City and County of Honolulu.
3. Electric magnetic fields (EMF) are reduced with underground lines. (Note: EMF risk is also substantially reduced with the proposed mid-level mauka system, since it is away from urban areas.)

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4. Underground lines require less frequent maintenance and repair than overhead lines because they are protected in concrete and PVC conduits. Also, overhead lines located in remote areas are difficult to get access to for construction, repair and maintenance. However, according to the applicant, repair and maintenance costs per incident are higher for underground lines than overhead lines.

VISUAL IMPACTS:

HECO performed a limited visual analysis for the mid-level mauka alignment from sight lines along Kamehameha Highway. HECO noted where along the preferred alignment the transmission lines and poles would be visible from Kamehameha Highway. According to HECO, the line would be visible from various view planes along Kamehameha Highway near Turtle Bay where it passes through the Agricultural District, which is outside of the jurisdiction of the Board of Land and Natural Resources (Board). The line would also be visible as it exits the Waialua area along Kamehameha Highway and proceeds northbound towards Waimea.

Above Waimea Valley, the proposed transmission line alignment was moved 2,000 to 5,000 feet mauka of the preferred EIS alignment due to concerns raised by the owners of the park. According to HECO, this is 8,000 feet mauka of the falls and out of sight from other users of the mauka/inland portions of Waimea Falls. In addition, HECO notes that due to significant separations and varying topographic features within the valley, the proposed line will not be readily visible to the general public. At Anahulu Gulch, the line is 8,000 feet mauka of Kamehameha Highway.

Staff notes that HECO's visual analysis of the project was based on a maximum pole height of 63 feet. However, subsequent to the visual analysis and acceptance of the FEIS, HECO proposed a change from wooden to steel poles with a maximum height of 88 feet. Although this would tend to reduce long-term maintenance costs and reduce failure rates stemming from high winds or hurricanes, it would increase the likelihood that the steel poles and power lines would be more visible than had been previously disclosed in the EIS. In addition, HECO may be required to install visual markers on the conductors if the distance between the conductors and the ground is greater than 200 feet. According to HECO, the conductors are more than 200 feet above the ground where it spans three gulches: Anahulu Gulch, Kaiwikoele Gulch and Kamanamui Gulch. These visual markers (which staff assumes would be colored) could visually impact the aesthetics of the area.

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A visual analysis was not conducted for the Kamehameha Highway overhead alignment. As such, it is more difficult to assess the potential impacts of this alternative on view planes.

However, if a new 46 kV overhead line was placed along Kamehameha Highway, the existing 12 kV and 4 kV lines could possibly be co-located on a single pole with the 46 kV line, thus mitigating the incremental visual effect of the new 46 kV line. According to HECO, this may not result in the elimination of all of the existing wood poles supporting the 12 kV and 4 kV distribution lines and GTE Hawaiian Telephone lines, since the spanning requirements for the smaller cables is different. In addition, the new 46 kV system would require taller poles than the existing poles along Kamehameha Highway. HECO also notes that, in many cases, combining such lines on single poles can reduce the level of electric and magnetic fields.

PROJECT NEED:

On August 14, 1996 staff received a fax transmittal from the Chairman of the North Shore Neighborhood Board (Exhibit 11). The letter states that the Board opposes a 46 kV subtransmission line from Waialua to Kahuku due to the following reasons:

1. The need for the line has not been clearly established.
2. The proposed alignment places significant view plains at risk.
3. The broader community has not been effectively informed.
4. Specific questions concerning the project have not been adequately addressed.

According to HECO, the purpose of the new subtransmission line is threefold: 1) maintain reliable electrical service to the North Shore of Oahu by correcting low voltage conditions; 2) provide an alternative subtransmission line that can provide service in the event of failure of the existing 46 kV line; and 3) provide additional transmission capacity to meet the growing demands of existing customers and to accommodate projected lead growth along Oahu's North Shore.

Staff asked HECO to elaborate on each of the three justifications for the new line. Their explanation was as follows:

1. Low Voltage:

Apparently, there is a low voltage problem on the North Shore. Low voltage causes lights to be dim and computer terminals to flicker. This occurs when one of the two circuits on the existing 46 kV line are not in service. According to HECO,

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this has been problem since 1992. Apparently, a low voltage condition is a violation of the Public Utilities Commission's (PUC) tariffs (standards). According to HECO, the new 46 KV will correct this problem.

2. Back-up System:

Another purpose of the second 46 KV subtransmission line to provide back-up transmission to North Shore residents when one of the two subtransmission lines is down. According to HECO, there have been six (6) power outages on the North Shore over the past two years attributed to failure of the existing 46 KV line.

3. Additional Transmission Capacity:

According to HECO, demand for electricity is not actually based on population growth or projections, but based on "load growth". This load growth is based on an increase in demand of 1 percent per year on the North Shore.

Staff notes that population projections on the North Shore have been exceeded, according to the City and County of Honolulu, Planning Department. However, whether real population on the North Shore has exceeded projections is speculative, and a matter of debate at the City.

PUBLIC INFORMATION PROGRAM:

According to HECO, a public information program was developed as an integral component of the project. The purpose of the public information program was twofold: 1) to provide information on the project to the affected communities and their representative organizations, landowners and government agencies and elected officials; and 2) to obtain public feedback on their concerns and desires in relation to the project.

HECO conducted a number of project information meetings for the community. Presentations were made March of 1992 through February of 1993. HECO also made recent presentations to the North Shore Neighborhood Board regarding the project and the Conservation District Use Application.

According to HECO, it appears that community/public, landowner and agency concerns, taken in the aggregate, did not reflect an agreed upon preference of alignment. However, according to HECO, the general public/community consensus ranged from "favoring" an underground alternative to "acceptance" of a mauka overhead route.

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Major landowners and developers, on the other hand, generally supported the placement of the new subtransmission line along Kamehameha Highway. During the EIS preparation process, the Department of Land and Natural Resources (DLNR) recommended that the subject transmission line be placed along Kamehameha Highway.

Upon review of the results of Public Information Program in the Routing Report, it appears that no single preference, aside from the coastal underground alternative, was dominant. However, the Drum road alternative (one of the furthest mauka) was mentioned by the following groups: North Shore Neighborhood Board, Sunset Beach Community Association, Campbell Estate, Waimea Falls Park. Staff notes that this alternative was not selected by HECO due to high construction costs. The mid-level mauka route that was selected by HECO appears to have been a compromise from the Drum road alternative, but no entity appears to have been in favor of this alignment, at least not on paper.

Upon review of the report, however, it does appear that there were a lot of concerns regarding the Kamehameha Highway overhead alignment as mentioned on page 14 of this report.

MITIGATION MEASURES:

In term of project mitigation, many of the potential impacts of the transmission line were anticipated during the Routing Report and were mitigated by avoidance.

With respect to the mid-level mauka alignment, other mitigation measures are as follows:

1. Initial right-of-way clearing practices and long-term vegetation management operations are designed to minimize environmental impact and prevent significant erosion.
2. A botanist would accompany the field crew when the final power and pole sites and helicopter landing pads have been selected. There are no landing pads proposed in the Conservation District.
3. The realignment 2,000 to 5,000 feet mauka of Waimea Falls also appears to have reduced the potential for visual impacts of the project from vantage points within Waimea Falls Park.

In addition, the Department of Transportation noted in their comments, that to mitigate visual impacts, an existing overhead 46 kV subtransmission line that corresponds to a portion of the proposed project should be moved to the newly proposed 46 kV

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circuit's steel poles and the wooden utility poles removed. They would have also preferred that both circuits be placed underground to improve the view plane and traffic safety.

If a coastal underground system were built by HECO, the need for mitigation measures would be significantly reduced because long-term environmental effects of underground lines are negligible. Impacts from underground systems occur during construction. These impacts would include noise and dust due to trenching as well as disruptions in traffic flows along Kamehameha Highway. Although these impacts would be significant, they would cease upon completion of the project. Also, because the line is subterranean, it could impact subsurface archaeological sites along the highway.

If a new 46 kV overhead line was placed along Kamehameha Highway, the existing 12 kV and 4 kV lines could possibly be co-located on a single pole with the 46 kV line, thus mitigating the incremental visual effect of the new 46 kV line. According to HECO, this may not result in the elimination of all of the existing wood poles supporting the 12 kV and 4 kV distribution lines and GTE Hawaiian Telephone lines, since the spanning requirements for the smaller cables is different. In addition, the new 46 kV system would require taller poles than the existing poles along Kamehameha Highway. HECO also notes that, in many cases, combining such lines on single poles can reduce the level of electric and magnetic fields.

In addition, in terms of car accidents, if HECO could reduce the total number of poles along Kamehameha Highway by co-locating the existing 12 kV lines, 4 kV lines and telephone lines, with the 46 kV line on a single steel pole, this could actually improve traffic safety. Also, co-locating the existing distribution lines on the new steel poles (which are designed to withstand heavy loads imposed by flooding or tsunamis) could reduce the risk of system failure due to high winds or flooding. Although some of the wood poles would still be needed, potential flood damage to the existing 12 kV and 4 kV lines could still be mitigated with the addition of a new 46 kV pole system along Kamehameha Highway.

SUBZONE CONSISTENCY:

The objective of the Resource subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas.

Section 13-2-21 of the Administrative Rules states that all applications shall be reviewed in such a manner that the objective of the subzone is given primary consideration.

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Staff has determined that the proposed use is consistent with the objectives of the Limited, Resource and General subzones for the following reasons: 1) the use is an identified public purpose use in the Protective subzone, which is the most restrictive land use district in the State of Hawaii; and 2) the applicant appears to have taken substantial measures to alleviate potential impacts on view plains and EMF by relocating the line in the mauka areas of the North Shore of Oahu. However, subzone compatibility is not the only criteria staff considers in an evaluation of a project. If a more appropriate alternative can be identified which avoids the use of conservation resources, this alternative should be pursued.

OUTSTANDING ISSUES:

1. The EIS represented that wood poles would be used and that the maximum height of the wood poles would be 63 feet. However, subsequent to completion of the FEIS, the applicant decided to use steel poles with a maximum height of 88 feet.
2. Problems caused by acquisition of easements along the alignment to permit the construction of, operation and maintenance of the line. If negotiations with private property owners to obtain right-of-way easements are not successful and adjustments to the routing of the line are impractical, HECO may exercise it's right of eminent domain.
3. There has been speculation over the effects of electromagnetic fields (EMF) generated from power lines, on human health. According to the applicant, because has been no conclusive evidence on the health effects associated with electric and magnetic fields, HECO has adopted a policy to minimize EMF effects on humans whenever feasible by directing lines away from residential areas and by configuring conductors in a manner that reduces the fields generated.
4. The North Shore Neighborhood Board opposes the project.
5. There does not appear to be a dominant community preference with respect to any particular alternative, other than the coastal underground alignment and the Drum Road alignment, to a lesser extent. However, both of these were rejected by HECO due to costs.

CONCLUSION:

staff is concerned over the proliferation of overhead transmission lines and subtransmission lines throughout the State and the overall impact of this technology on our State's natural beauty and

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scenic areas including the North Shore of Oahu. Moreover, staff is concerned over the lack of a community preference for the route selected by HECO for the 46 kV system.

With respect to construction costs, an underground system is much more expensive than a comparable overhead system, while long-term maintenance costs are somewhat less for an underground system. As such, barring a major hurricane, tsunami or fire, it appears that overhead systems are more affordable than underground systems. In terms of the environment, the major impacts stemming from an underground system occur initially in the form of noise and dust as well as disruptions in traffic flows. However, after the utility lines are installed and construction is completed, environmental impacts are negligible. With an overhead system, construction impacts are moderate, but impacts on the environment remain in perpetuity.

In addition, with an underground system, most of it would be located in the Kamehameha Highway right-of-way, thus reducing or even eliminating the cost associated with right-of-way acquisition. (Note: HECO must pay for new right-of-way easements for the mauka alignment from various landowners including the State of Hawaii.) In addition, HECO has a franchise with DOT which grants HECO the right to use State and City roads for their lines.

The applicant points-out that even with an underground route along Kamehameha Highway, existing 12 kV and 4 kV utility lines would remain overhead. However, HECO could place the existing overhead lines in underground conduits beside the new 46 kV system. This action would also mitigate existing risks to human health from electric fields generated by the existing overhead lines. Risks from natural disasters would also be reduced, thus enhancing the overall system reliability and reducing repair costs. Moreover, removal of existing poles along Kamehameha Highway might enhance motor vehicle safety and improve view plains.

If a new 46 kV overhead line was placed along Kamehameha Highway, the existing 12 kV and 4 kV lines could possibly be co-located on a single pole with the 46 kV line, thus mitigating the incremental visual effect of the new 46 kV line. According to HECO, this may not result in the elimination of all of the existing wood poles supporting the 12 kV and 4 kV distribution lines and GTE Hawaiian Telephone lines, since the spanning requirements for the smaller cables is different. In addition, the new 46 kV system would require taller poles than the existing poles along Kamehameha Highway. HECO also notes that, in many cases, combining such lines on single poles can reduce the level of electric and magnetic fields.

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However, this alternative would cause disturbances to residents living along the highway during construction. In addition, staff does not know what the actual visual impacts would be along Kamehameha Highway, since there was no visual analysis done for this alternative.

In terms of the direct environmental impacts associated with the proposed overhead mid-level mauka alignment, substantial clearing of vegetation including some native vegetation would be required. This would lead to an increase in erosion and sedimentation. In addition, the use of herbicides to retard plant growth along the alignment would increase the amount of chemical residues in the ecosystem. There are also visual concerns that have been raised by agencies and individuals. Although visual impacts are difficult if not impossible to quantify in monetary values, the effects of these lines on the human mind are surely negative. One wonders if and when non-tangible costs associated with overhead lines will begin to affect our visitors' decisions to return.

Staff is also sensitive to cost of living issues in Hawaii. New utilities undoubtedly increase the cost of services to businesses and the general public. The bottom line, in most cases, is money.

In terms of the additional cost to rate-payers, it is staff's understanding (based on a discussion with HECO personnel), that a \$100 million dollar expenditure by HECO translates into an increase in \$1.50 per month, for a standard household utilizing 600 kilowatt hours of electricity per month. As such, the difference in cost between the proposed mid-level mauka system and Kamehameha Highway underground system translate into a .30 to .40 cent increase every month for a household utilizing 600 kilowatt hours, or about one plate lunch for the first year. In addition, based on information in the Waiau-CIP Decision and Order, over the depreciation life of transmission lines, the cost impacts would be slightly less than half of this, or about .15 to .20 cents per year for the coastal underground alternative. However, according to HECO, the total cost to the State would be greater, because businesses (who might pass the extra cost to the consumer) and government agencies would certainly pay more per month than a typical residential customer. In the PUC Decision and Order on the Waiau 138 KV Transmission line, HECO calculated that the average impact on all of its customers (commercial and residential) of placing the system underground would be approximately \$9 to \$10 per month more than if the lines were placed underground. For the Waialua to Kuilima project, this translates into approximately \$2.50 per month per customer. Staff does not know how these calculations were derived or what they mean for the majority of rate payers. Another problem, according to HECO is that decisions to place lines

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underground would create a precedent, and impact HECO's customers if such a precedent were extended to future systems.

Staff does not know what the cost of the Kamehameha Highway overhead line would be compared to the mid-level mauka system since revised cost projections were not received for the Kamehameha Highway overhead system.

In reviewing this application, three important questions are as follows: 1) whether the benefits to the general public, in terms of placing the Waialua to Kuilima Subtransmission line through the Conservation District, outweighs the costs to the public of placing the proposed Waialua to Kuilima Subtransmission along Kamehameha Highway, where there are existing overhead transmission lines; 2) whether the Board should allow the irretrievable commitment of conservation resources when it can be avoided at virtually no extra cost to rate payers (the cost of the overhead coastal and mid-level mauka systems are not significantly different); and 3) whether a new system on the North Shore is actually needed. On the third question, the Department must defer to the experience of HECO and the PUC. The first question involves issues regarding costs and benefits, personal values and the public interest in the broadest sense, and staff is not in a position to make recommendations with respect to these matters. However, staff believes that the second question is a technical matter which may be addressed in a technical matter, as follows.

Community Preferences:

In reviewing this case, it has become clear to staff that HECO's selection of the mid-level mauka alignment rather than the Kamehameha Highway (overhead) alignment was driven by their belief that some elements of the community opposed a coastal overhead route. According to HECO, their selection was also driven by project costs which were initially thought to be higher for the coastal overhead alignment.

It is staff's understanding that HECO originally planned to install Waialua to Kuilima 46 kV subtransmission line along Kamehameha Highway, but opted to conduct the routing study due to their experience with the controversial Waiau 138 kV transmission project.

Through the process of developing the routing report for the Waialua to Kuilima 46 kV project, the coastal overhead alignment received the highest scores, although the mid-level makai and mid-level mauka alignments ranked a close second and third (See Exhibit 8). In terms of the construction costs, HECO originally estimated

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the coastal overhead (OH/UG) route at \$10.1 million and the mid-level mauka route at \$8.2 million, excluding easement acquisition.

However, the length of the mid-level mauka alignment was increased by nearly two miles subsequent to the completion of the FEIS/Routing Report, thus increasing construction and maintenance costs associated with the system. Staff contacted HECO to obtain more recent cost estimates for the mid-level mauka alignment. At that time, HECO represented that the total cost, including easement acquisition costs, would be \$12.16 million. However, subsequent to this second projection, staff received a revised cost projection for the mid-level mauka route. This projection included construction, materials and survey costs, but excluded easement costs, engineering and planning costs. Based on this, HECO's projection was \$6,729,200. Staff does not know how this compares to the coastal overhead route since staff didn't ask for a formal cost comparison of the two broken down into construction, materials and survey costs.

If the selection of the mid-level mauka route was largely based on community preferences, it was not because the community preferred or accepted this route. There is no mention for or against the mid-level mauka alignment in the Public Information Program report. (Note: There is one letter from a representative of the Sunset Beach Community Association submitted to the DLU in 1993 in support of the project.) Staff feels that HECO's decision to choose the mid-level mauka route was not actually based on a community preference for this route. Rather, their decision was driven by various concerns held by elements of the North Shore community with respect to the Kamehameha Highway overhead route, as well as the higher cost of the coastal underground and makua (Drum road) alignments. HECO's decision was also based on the lack of any strong objections to their selection during the EIS preparation process, although the DLNR did initially recommend that the system be placed along Kamehameha Highway.

Staff met with HECO representative on several occasions to discuss community involvement in the route selection process. According to HECO, the main concerns of the North Shore community with respect to a new overhead line along Kamehameha Highway were related to traffic safety and visual concerns. Human exposure to EMF did not appear to be a major concern, although it usually is with new power lines. One concern was the possibility of vehicles crashing into the new poles. Another concern was the taller poles impacting coastal view planes. There were also concerns over possible flood damage and public safety from lines falling down.

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However, in terms of the community's concerns, staff wonders if HECO actually made a strong effort at mitigation. If the health effects of EMF is not a significant concern, as represented by the industry, and if utility poles can be designed to handle larger loads resulting from coastal flooding or tsunamis, staff believes that the new 46 KV line could very well be placed along Kamehameha Highway. In addition, perhaps fewer wooden poles would be needed if the existing 12 KV and 4 KV lines could be transferred to the new pole structures. This could also alleviate concerns regarding traffic accidents and potential flood damage to the existing distribution lines. However, this is all speculative since it doesn't appear that HECO gave serious consideration to these matters, although they represented that such matters were discussed at the public meetings.

Another problematic issue is that HECO has already expended much time and money on the mid-level mauka alignment in terms of preparation of the EIS, completed survey work and landowner negotiation for mauka easements. HECO staff indicated that they have expended nearly \$2 million on the project over the past four years. If this application were denied, HECO would be required to repeat the EIS process and probably spearhead a new community consultation program. In addition, a Major Special Management Area Use Permit would be required from the City Council for a coastal overhead system. HECO estimates that this could potentially set the project completion deadline back another four years.

Project Acceptability:

Staff is not opposed to the construction of a transmission line through the Conservation District. Transmission lines are, in fact, an identified use in the Department's Administrative Rules in all of the subzones. In addition, there are existing transmission lines throughout the Conservation District. Moreover, HECO believes that this transmission line, as proposed through 18,000 lineal feet of the Conservation District (23 percent of the total alignment), would not be visible to the general public, although it would be visible in other areas of the North Shore.

Based on the findings of the Routing Report, staff would have preferred that HECO work with DOT, Highways and the North Shore community to place the line along Kamehameha Highway where there are existing power and telephone lines, rather than through unspoiled areas. The cost differentials for the two systems are not that significant. Unfortunately, it is hard for staff to tell whether the community's reaction to the Kamehameha Highway system was based in reality or fiction, because there is little information regarding the costs, benefits and actual impacts of

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this system. Staff believes that HECO could have done more to address these concerns by conducting a view plane analysis of the coastal alignment and emphasizing some of the potential benefits of a coastal route as represented in this report. In the future, HECO should work more closely with the DLNR, at the early stages of project planning if Conservation and/or State lands are affected by HECO projects.

Staff can find no compelling reason to recommend denial of this application. HECO has proposed reasonable mitigation measures and there are no major objections to HECO's preferred alignment, except from the North Shore Neighborhood Board.

Staff, therefore, recommends as follows:

RECOMMENDATION:

That the Board of Land and Natural Resources approve Hawaiian Electric Company, Inc's application to construct a new 46 kV Subtransmission line through Anahulu Gulch, Upper Waimea Valley, and the Pupukea Forest Reserve, at the North Shore of Oahu, on lands identified as TMKs: 5-9-06:26; 6-1-02:02; 6-1-06:01; 6-2-08:25; 6-2-09:01; and 6-2-10:01, subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules and regulations of the Federal, State and County governments, and applicable parts of Section 13-2-21, Administrative Rules as amended;
2. The applicant shall comply with all applicable Department of Health Administrative Rules;
3. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury and death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
4. The applicant keep clearing activities to a minimum disturbance and during low rainfall months (April-October);

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5. The applicant shall replant or cover bare areas as soon as grading or construction is complete;
6. The applicant shall keep the construction of spur roads to a minimum;
7. Staging areas shall not be permitted in the Conservation District;
8. Any poles visible from the coastal area or Kamehameha Highway shall be painted an appropriate color to blend in with the surrounding environment;
9. The project realignment through Waimea Valley shall not increase the visibility of the project to the general public;
10. A qualified botanist will accompany the field crew when the final power and pole sites and helicopter landing pads have been selected and flagged;
11. The applicant shall use mulch, vegetation, gravel, and porous pavement wherever feasible to minimize the increase of impervious surfaces;
12. The applicant shall prevent concentrated stormwater flows onto and off of access roads and parking areas through proper grading;
13. The applicant shall submit an acceptable archaeological inventory survey report for the entire Waialua-Kuilima 46kV Subtransmission Line Project to the Historic Preservation Division prior to the initiation of construction activities;
14. The applicant shall obtain the approval of the private property owners for the project;
15. The applicant shall apply for a right-of-entry to State-owned lands utilized within the project area and supply to the Department of Land and Natural Resources, Land Division, appropriate metes and bounds survey description of easement areas on any State-owned lands on which the proposed easement is located;

Board of Land and
Natural Resources

OA-2807

16. The applicant shall submit a Fire Contingency Plan to the Department of Land and Natural Resources, Division of Forestry and Wildlife, for review and approval;
17. Any work to be done on the land shall be initiated within one (1) year of the approval of such use, and all work and construction must be completed within three (3) years of the approval of such use;
18. The applicant shall submit four (4) sets of the construction plans and specifications to the Chairperson or his authorized agent for approval with the permit declarations set forth in the permit application. Three (3) of the copies will be returned to the applicant. Plan approval by the Chairperson does not infer approval required by other agencies. Compliance with condition 1 and 2 remain the responsibility of the applicant;
19. All mitigation measures set forth in the accepted Final Environmental Impact Statement for this project are hereby incorporated as conditions of approval;
20. Should historic remains such as artifacts, burials, or stone pavings or wall be found during construction, the applicant shall stop work in the area and contact the State Historic Preservation Division immediately, at 587-0046;
21. The applicant shall notify the Department when construction is initiated and when construction is completed;
22. That in issuing this permit, the Department and Board has relied on the information and data which the permittee has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;
23. That failure to comply with any of these conditions shall render this Conservation District Use Application null and void; and

Board of Land and
Natural Resources

OA-2807

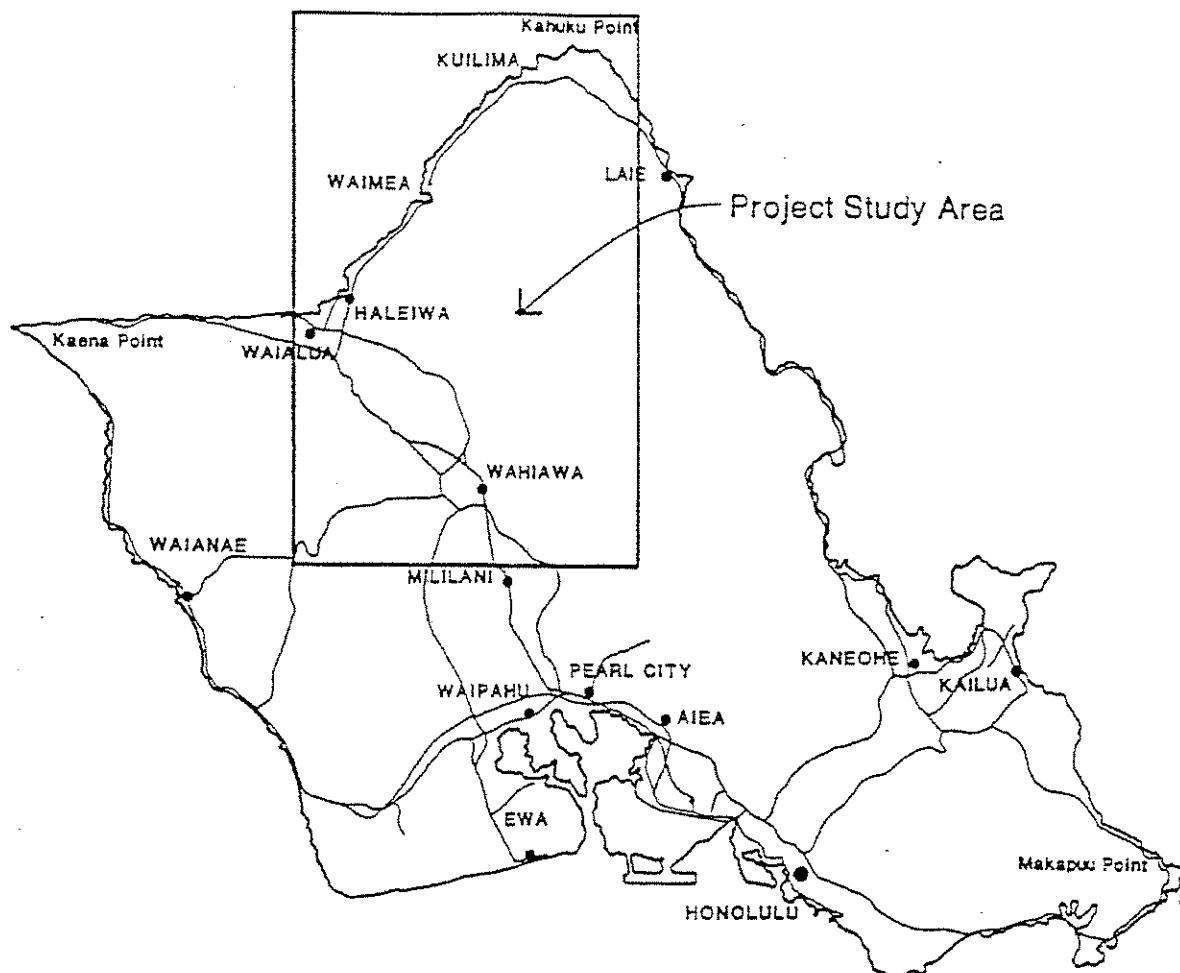
24. Other terms and conditions as prescribed by the Chairperson.

Respectfully submitted,

Samuel J. Lemmo
SAMUEL J. LEMMO
Staff Planner
[Signature]

Approved for Submittal

MICHAEL D. WILSON
MICHAEL D. WILSON, Chairperson
BOARD OF LAND NATURAL RESOURCES

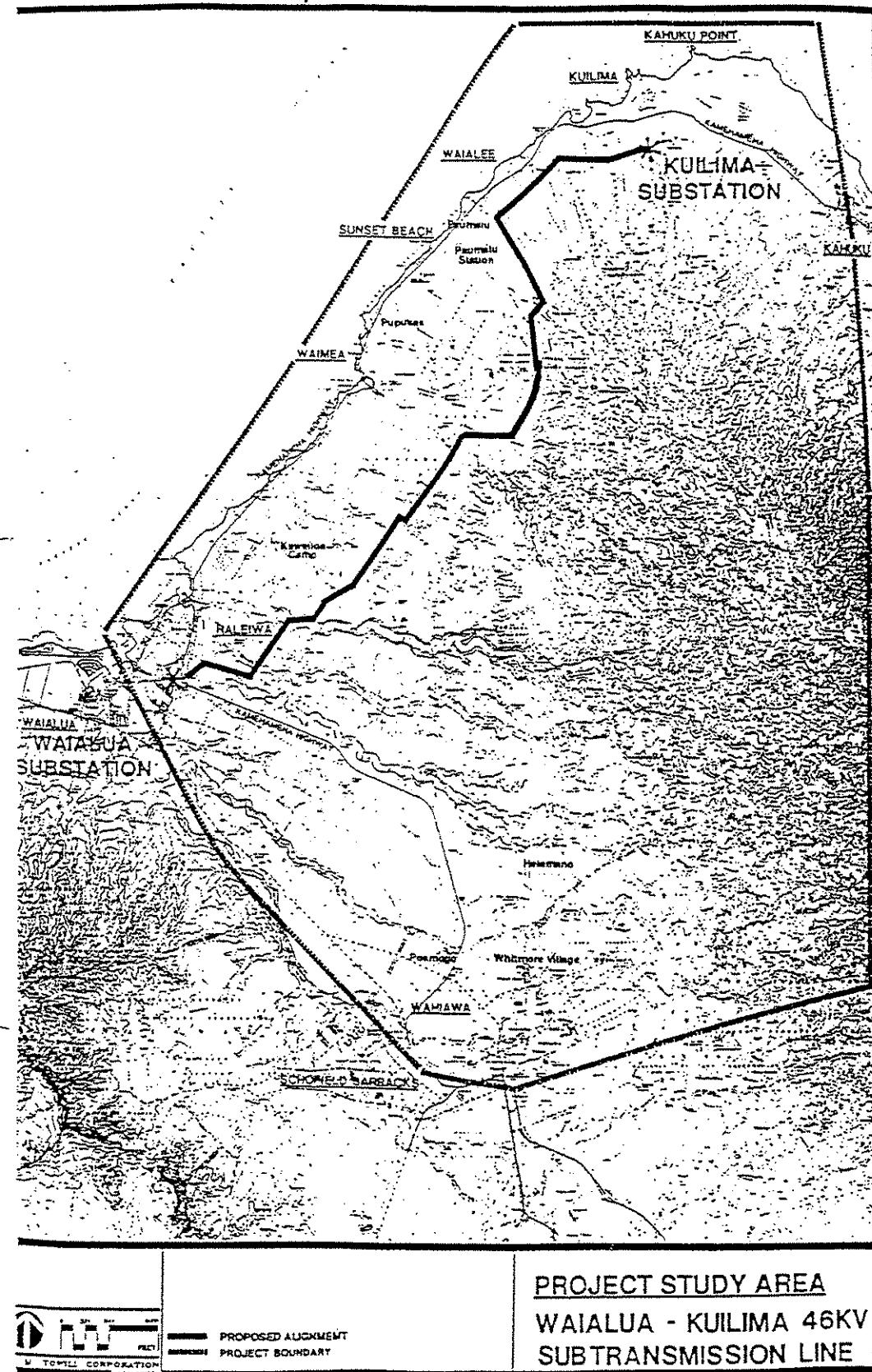


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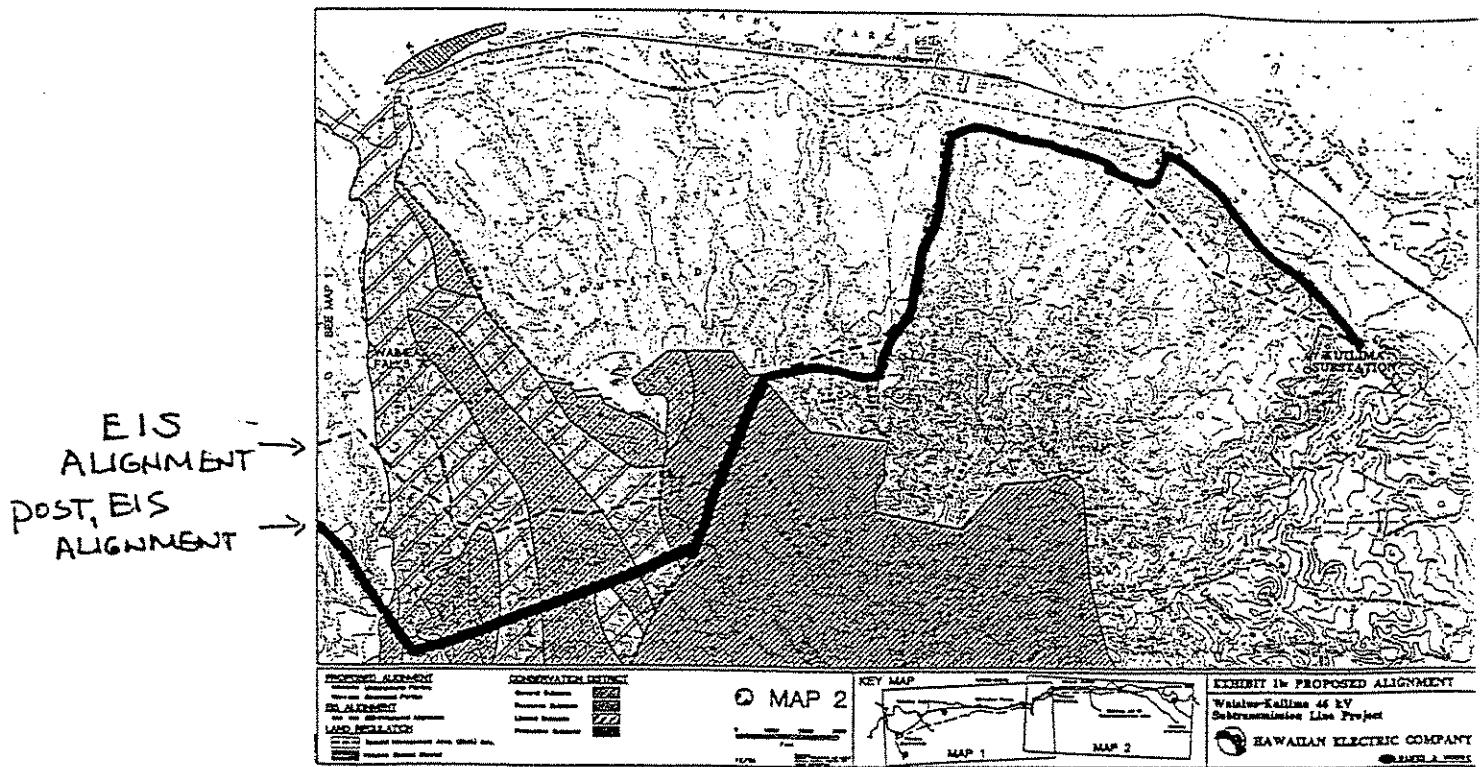
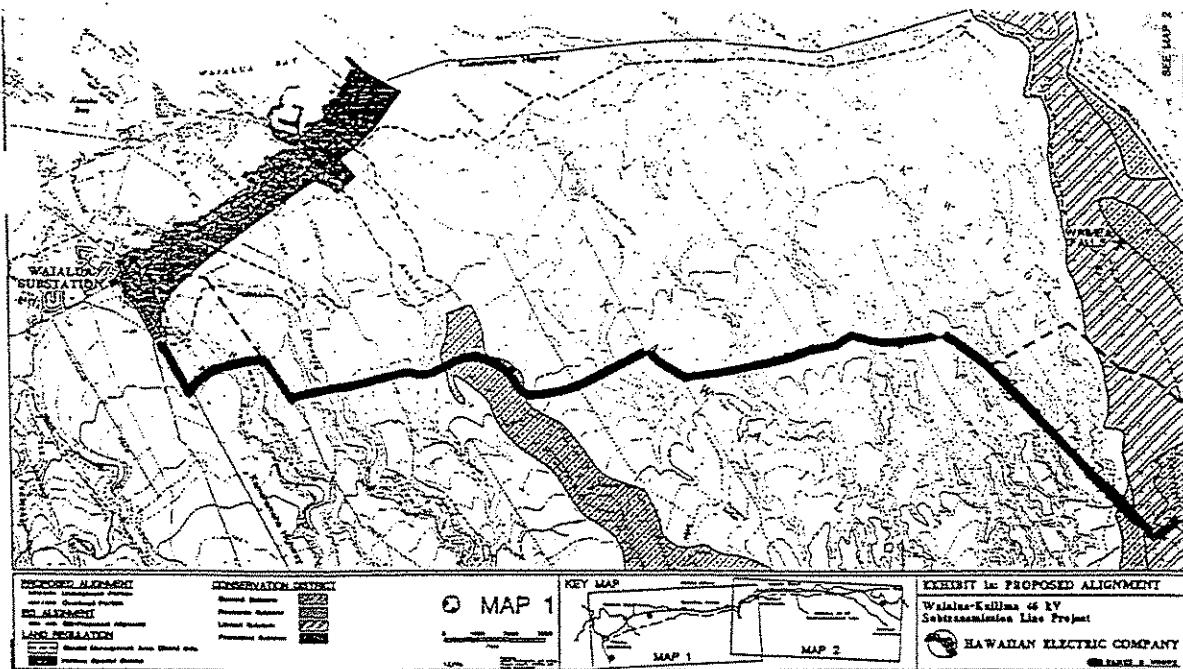
R. M. TOWILL CORPORATION

FIGURE 141
LOCATION MAP
WAIALUA-KUILIMA 46 KV
SUBTRANSMISSION LINE
HAWAIIAN ELECTRIC COMPANY

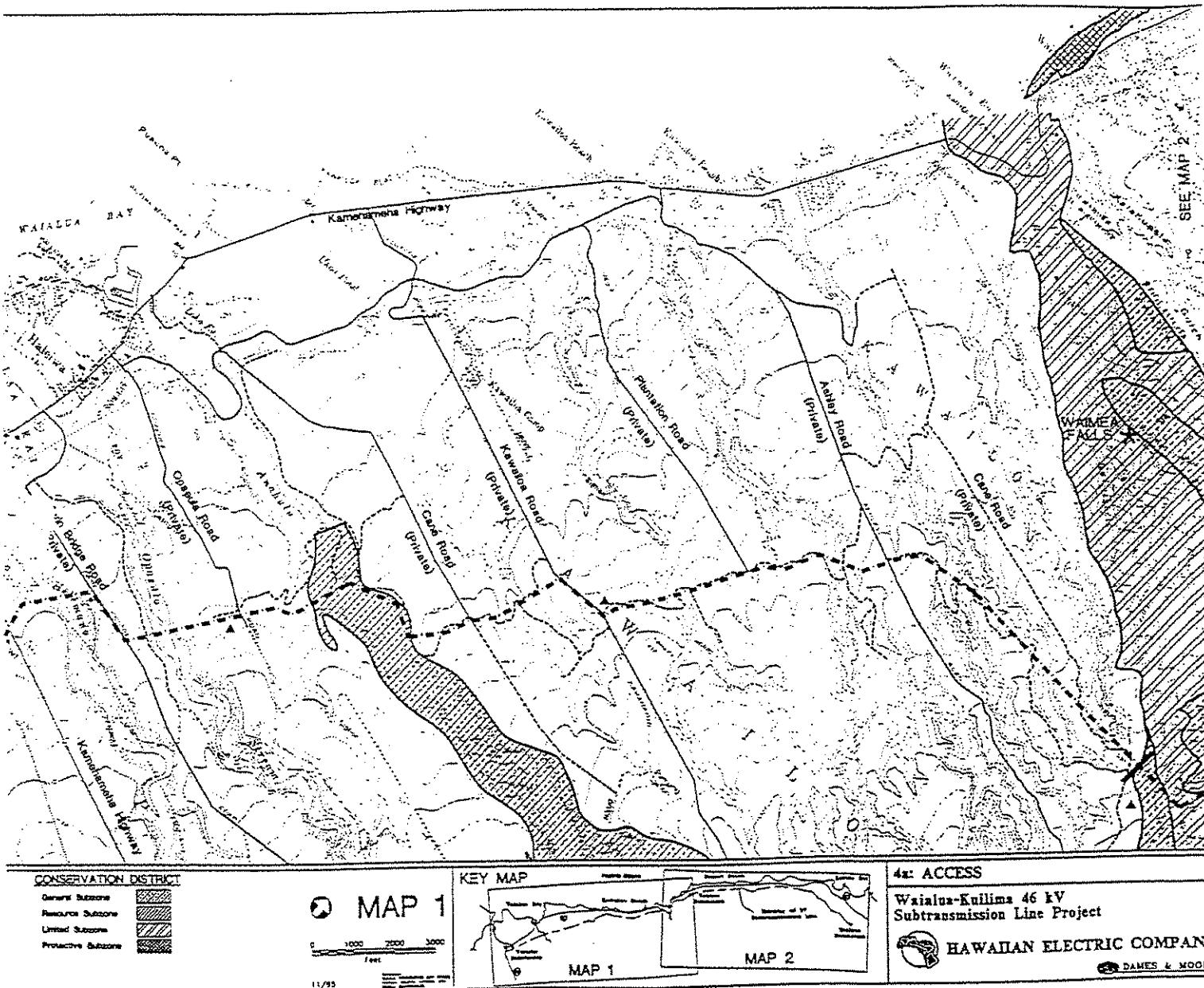
Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu



Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu



Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuiliina, North Shore, Oahu

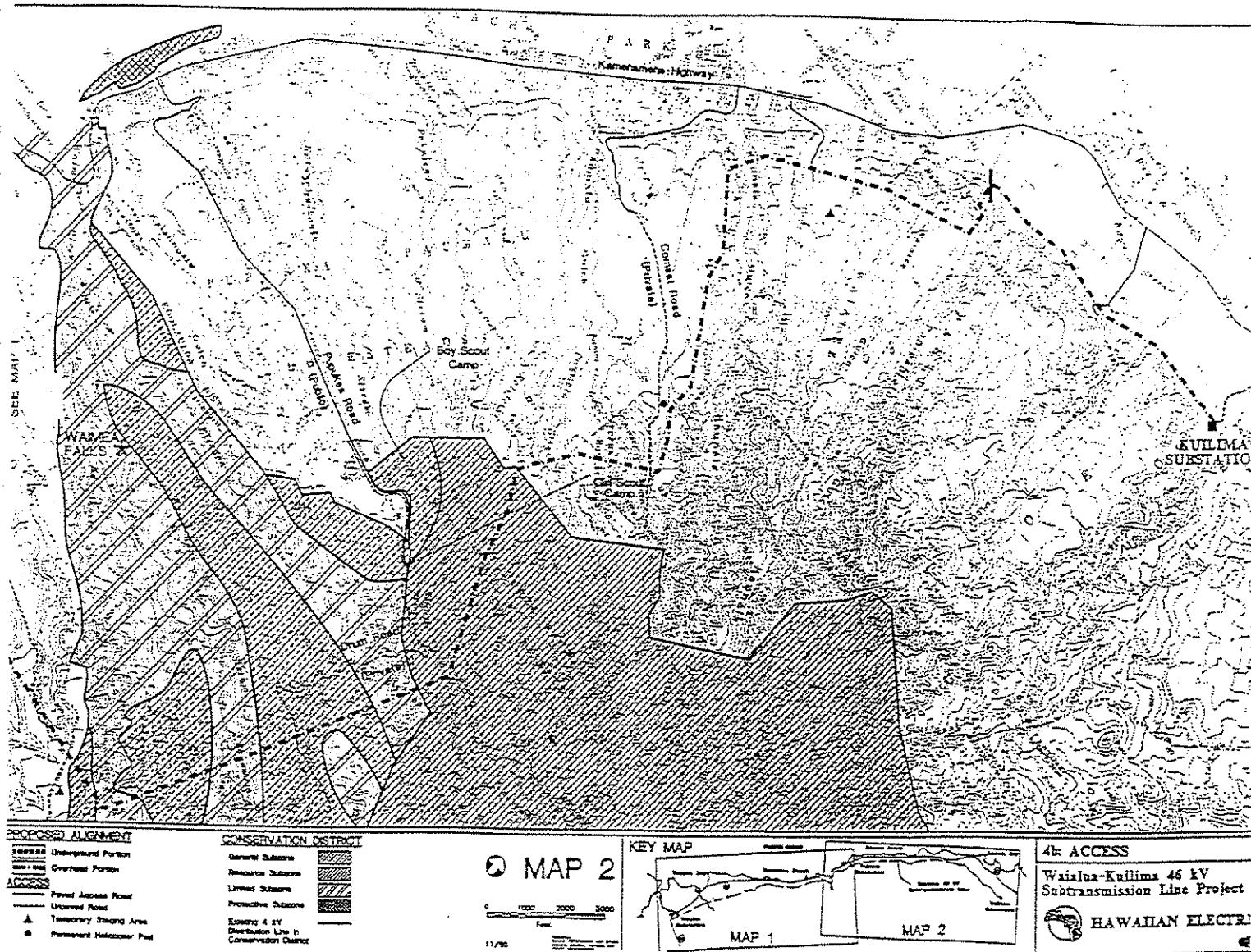


Conservation District Use Application OA-2807 to Construct a 46KV
Subtransmission, Waialua to Kuilima, North Shore, Oahu

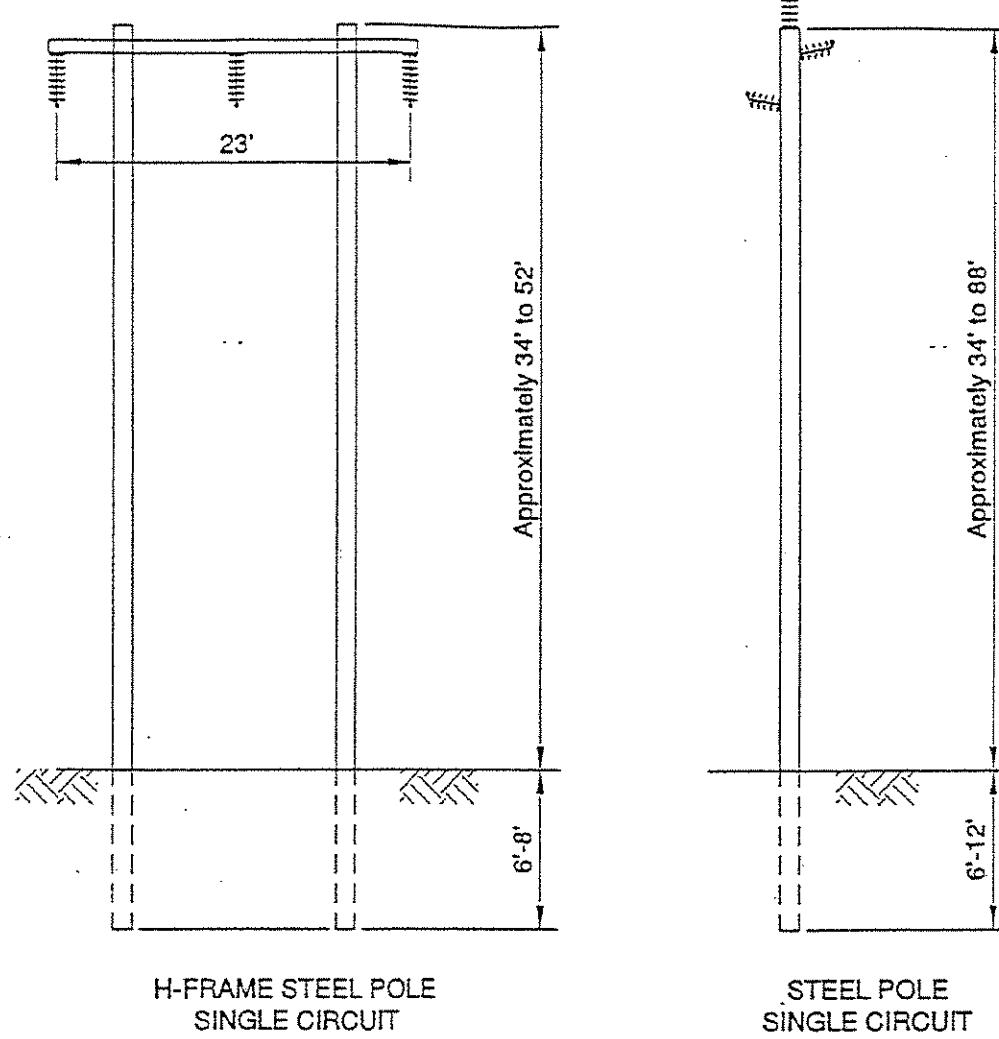
EXHIBIT 4

Subzone Map

Pg. 1 of 1

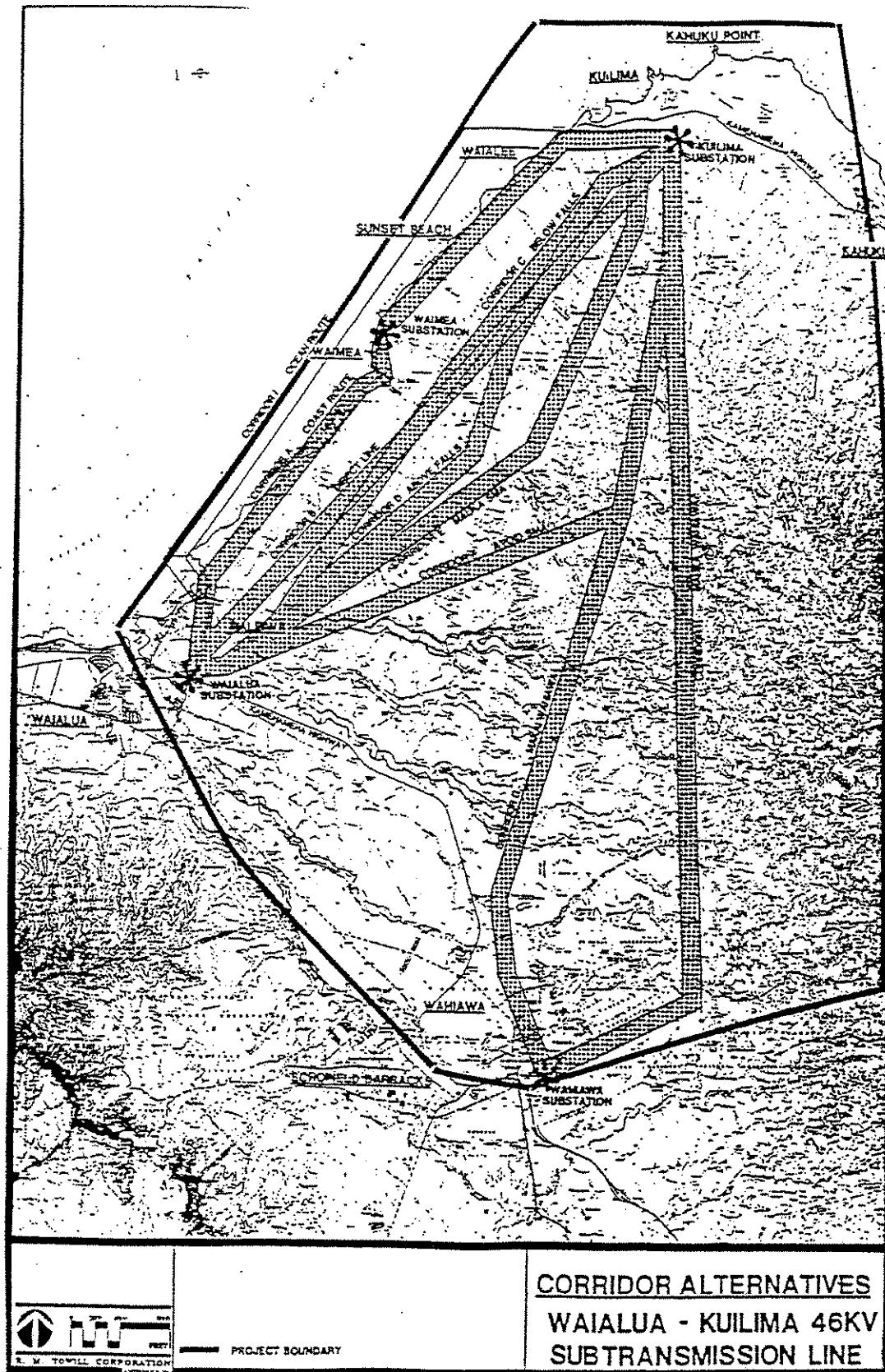


Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu



TYPICAL OVERHEAD LINE SUPPORT STRUCTURES
WAIALUA-KUILIMA 46kV SUBTRANSMISSION LINE

Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu



Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu

COMPOSITE SENSITIVITY ANALYSIS
Waialua - Kuilima 46 KV Subtransmission Alignment Alternatives

| A Alignment | Composite | | Environmental | | Engineering | |
|--------------------------------|-------------------------------|---|---------------|---|-------------|---|
| | B Equal Weight Ratio | C Ranking Equal Weighted 50:50 | D Ratio | E Ranking Environmental Weighted 70:30 | F Ratio | G Ranking Engineering Weighted 70:30 |
| Line A (Coastal, Overhead) | 1.51 | 1 | 1.72 | 2 | 1.31 | 1 |
| Line A1 (Coastal, Underground) | 1.79 | 4 | 1.48 | 1 | 2.11 | 5 |
| Line B (Bluff) | 2.44 | 6 | 2.47 | 5 | 2.41 | 6 |
| Line C (Mid-Level, Makai) | 1.63 | 2 | 1.82 | 3 | 1.45 | 2 |
| Line D (Mid-Level, Mauka) | 1.68 | 3 | 1.88 | 4 | 1.48 | 3 |
| Line E (Mauka) | 2.32 | 5 | 2.61 | 6 | 2.03 | 4 |

Col. C = ranking based on equal weighting of environmental and engineering ratios

Col. E = Composite ranking which weights the environmental scored by 70%, and the engineering by 30%.

Col. G = the opposite weighting as col. E

July 29, 1993

Conservation District Use Application OA-2807 to Construct a 46kV
Subtransmission, Waialua to Kuilima, North Shore, Oahu

ALTERNATIVE TECHNOLOGIES

There are two alternative system technologies for the proposed line. These are above ground and underground. Each of these alternatives is discussed below.

Overhead Systems

There are three overhead options for the pre-kV subtransmission line. These are addingension above existing poles, installing new single structures over flat terrain or installing two-frame structures over rough terrain. The option selected depends on the preferred alternative chosen.

Underground Systems

The underground technology is best suited for roadways and paved areas; however, disruption will occur during construction or repair. The underground transmission cable would be dielectric type consisting of three individual cables. Each cable would be installed in a separate conduit and spliced together in manholes every 1,000 feet. Trenching for the installation of the ducts and cables would be within the Kamehame Highway right-of-way.

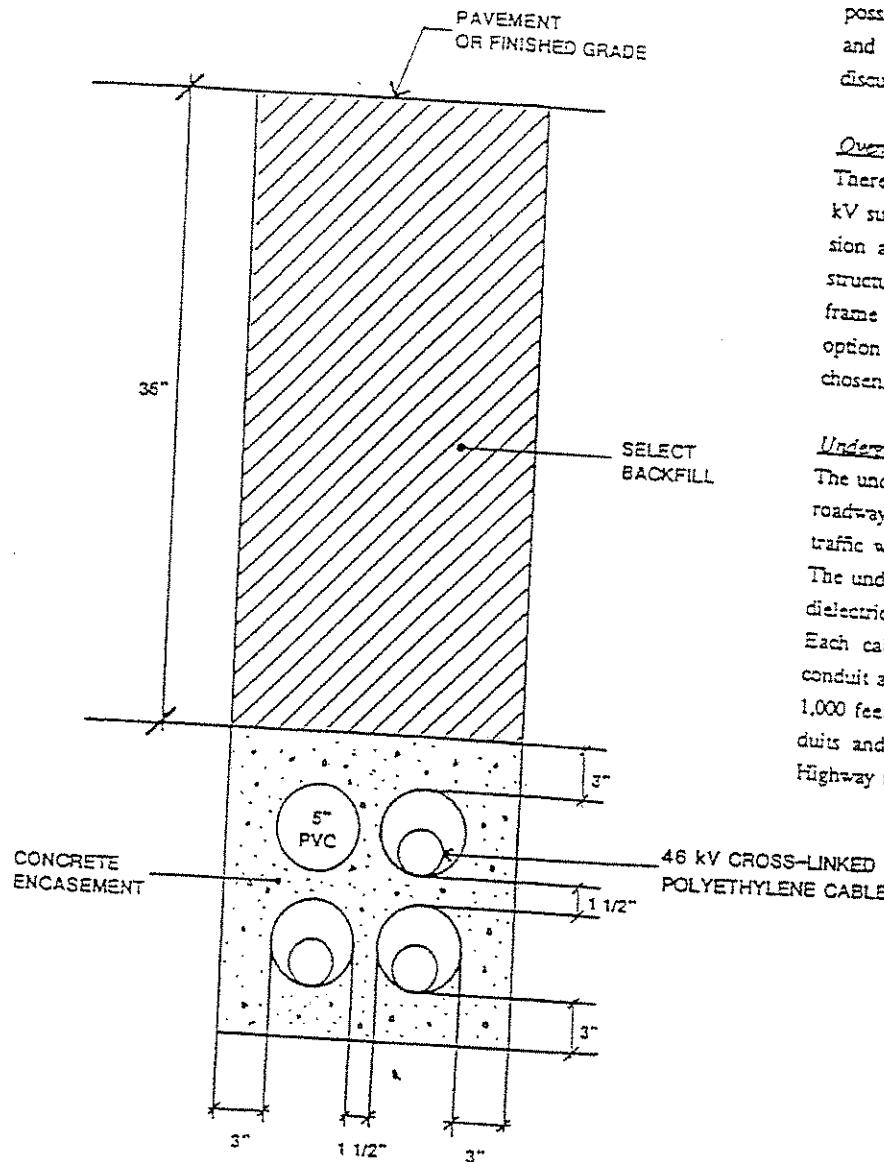


Figure 3-3
TYPICAL UNDERGROUND SECTION
WAIALUA-KUILIMA 46 KV SUBTRANSMISSION LINE
HAWAIIAN ELECTRIC COMPANY

Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu

Overhead vs. Underground Lines

The pluses and the minuses

A caveat. The issues are not quite as simple as listed below, but this is a starter. Here in short form are the advantages and disadvantages of underground and overhead power lines.

Aesthetics. The easy one first. Utility lines that you don't see are more attractive than the ones you do see. Whether the lines belong to the electric company, the phone company, the cable company, or the City and County, underground lines have a major aesthetic advantage.

Weather. Underground lines are not vulnerable to high winds or falling objects. They are more vulnerable to flooding and leaching. Regarding high winds, HECO has increased design requirements so that the transmission lines we construct today can handle winds of over 100 m.p.h.

Repair. Overhead lines generally require more frequent repair and maintenance. Underground R&M is more time-consuming and expensive per incident.

EMF. Electric and magnetic fields (EMF) occur around most electrical equipment and power lines (both underground and overhead). Scientific research on the health effects of EMF is still inconclusive. However, specially designed, steel encased (pipe-type) underground lines can reduce EMF levels. So can constructing overhead lines in certain configurations.

Conversion. Conversion from overhead to underground utilities is complex, labor intensive and costly. From an engineering standpoint, it must be done while maintaining utility services (electric, gas, phone, cable, water, sewer, etc.). Electric facilities such as transformers, switches, etc., now located on poles have to be relocated, perhaps on private property. Different property easements must be negotiated. In addition, the City and State would have to locate other poles for street lights.

Cost. The costs of a system vary not only on whether it runs above or below ground, but what kind of system it is, the terrain it covers, and "external" costs like the price of land easements. So cost ratios will vary. Estimates for some mainland lines run ten times higher for underground. The estimates for Part 2 of the proposed Waialua-CIP line are \$129 million to underground and \$25 million to go overhead.

A study conducted in 1993 estimated it would cost over \$13 billion to underground all existing and currently proposed power lines on Oahu. This would increase a typical monthly (600 kWh) residential bill by \$213. Residential customers would only pay part of the cost. Business and government would pay more of the cost because they use more of the electricity. They would have to pass on these higher costs to the public. Cable and telephone bills would be higher, too.

The consumer question

Underground or overhead? This is not purely a "company" question; it is a consumer question as well. As the Consumer Advocate pointed out to the 1992 session of the State Legislature regarding the Waialua-CIP line:

"I would like to note the precedential effect the decision to underground the 138-kV power line would have on the electric consumers on Oahu. Over time, the cost to install power lines underground to avoid the visual impact will increase the cost of electricity by hundreds of millions of dollars. Residential rate payers would be required to shoulder this burden when paying their own electric bills or having costs passed through to them in the products or services they buy."

Very simply, any change in policy must consider the impact on the consumer. It must weigh this cost against the already high cost of living in Hawaii. It must look at competing social needs, like education, transportation, housing and health, all of which economically impact every resident.

Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu



NORTH SHORE NEIGHBORHOOD BOARD NO. 27

P.O. BOX 607 • HALEIWA, HAWAII 96712

August 14, 1996

Michael D. Wilson
Department of Land and Natural Resources
P.O. Box 601
Honolulu, O'ahu, Hawai'i 96809

| Post-it® Fax Note | 7671 | Date | 10/10/96 |
|-------------------|-----------|---------|--------------|
| To | SAM KEMMO | From | KEN NEWFIELD |
| CC/DCC | | CC: | |
| Phone # | | Phone # | 638-5594 |
| Fax # | 587-0455 | Fax # | 638-0101 |

Re: CONSERVATION DISTRICT USE APPLICATION for a 46kV subtransmission line from Waialua to Kuilima, North Shore, O'ahu (FILE NO. OA-2807)

Dear Mr. Wilson, Mike

The North Shore Neighborhood Board held its regular meeting on July 23, 1996. The 15 member board passed the following motion on a vote of eight ayes, one nay and one abstention.

"The North Shore Neighborhood board opposes the proposed 46kV Subtransmission line from Waialua to Kahuku for the following reasons:

- 1: The need for the line has not been clearly established
- 2: The proposed alignment places significant view planes at risk.
- 3: The broader community has not been effectively informed.
- 4: Specific questions concerning the project have not been adequately addressed."

Thank you for asking the Board for input. If you have any further questions you may call me at 638-5594

Aloha,

KEN W. NEWFIELD



Conservation District Use Application OA-2807 to Construct a 46kV Subtransmission, Waialua to Kuilima, North Shore, Oahu

OCT-15-98 11:23 AM KEITH AVERY

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P-04

EXHIBIT 6

Division of Forestry & Wildlife

1151 Punchbowl Street, Rm. 325 • Honolulu, HI 96813 • (808) 587-0166 • Fax (808) 587-0160

August 12, 1998

MEMORANDUM

TO: Lauren Tanaka, Planner
Land Division

THRU: Dean Uchida, Administrator
Land Division

FROM: Michael G. Buck, Administrator
Division of Forestry and Wildlife *M. Buck*

SUBJECT: CDUA File #MA-2902, Zond Pacific, Inc. 20 MW Windfarm on Kahewa Pastures, Ukumehame ahupua'a, Maui TMK 4-8-01:08, approximately 200 acres.

We have reviewed this proposal with respect to its impacts on the natural resources and endangered species in particular. The attached represents DOFAW's comments to this CDUA, file # MA-2902 by applicant Zond Pacific, Inc..

Attachment

C: Maui DOFAW Branch

AUG 14 11 12 AM '98
JG

DOF-HD

ID: 808-243-5006

AUG 11 '98 16:09 No. 014 P.DI

EXHIBIT 6

DEPARTMENT OF LAND & NATURAL RESOURCES
Division of Forestry and Wildlife
Maui District

MEMORANDUM

August 11, 1998

TO: Nelson Ayers, Resource Management Planner
FROM: Wes Wong, District Manager *[initials]*
SUBJECT: Draft Environmental Assessment - Kahawai Pastures 20 MW wind farm,
Uaumehame, Maui, TMK 4-4-01, par. 2.

We have reviewed the subject document and have the following comments:

Na Ali Hale Trails and Access

Comments

1. The report seems to relate overall close consultation on the placement and mitigation of impacts on behalf of the Trails & Access Program. The report also suggests the project has a seeming fit with the Program's Vision statement and responsibilities. It describes a future scenario where impacts would be felt chiefly by maintenance and DLNR personnel. Finally, it suggests that consultation with State agencies has and will go far toward developing mitigative measures across a wide spectrum of impacts. We disagree.
2. A representative of Zond Pacific contacted Na Ali Hale several years ago to discuss setting up test equipment for wind force and duration sampling. However, there has been no other consultation or direct communication about the subject project with NAH District Staff. Claims of recent telephone consultation between Staff and the applicant representative are apparently false. No field inspections or other specific consultation related to placement of the proposed turbine structure has yet been made.
3. Important to the Lahaina Pali Trail's historical and interpretive context is its relative remoteness from developed areas. With the exception of damage to the trail resulting from constructing an access road during installation of the MECO 69KV Power Line project, and negative impacts to the views caused by the power poles and lines themselves, the area around the Trail remains relatively free of infrastructure intrusive to view planes. Construction of the proposed turbines would amount to a direct assault on these view planes from points along the trail.
4. Numerous incidents of trespass and unauthorized access by four wheel drive passenger cars, motorcycles, mountain bikes, and hikers are noted by our Department regularly. We believe the project will create an attractive nuisance in the sense that trespassers may be emboldened to approach the turbines and vandalize them. With our Department's diminished capacity to

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enforce no-trespass laws in the area, the project would likely become a magnet for periodic acts of vandalism.

5. As mentioned above, the Draft EA seems to suggest an overall acceptance on Na Ala Hele's part based on close consultation and a seeming fit with the Program's vision and responsibilities. In fact, the opposite is true. Our definition of "sound conservation principles" includes preservation of view planes and cultural heritage that is inconsistent with any large-scale, audibly moving turbine structures.

Wildlife:

Comments

1. Section 3.8.1 page 3-20. Footnote 3 denotes consultation by ZPAC with myself about birds, bird's habitats, and habits in reference to this project - This is false.
2. Section 3.8.2 page 3-23. A quote attributed to myself, "The breeding season is in the fall from October through December" is exactly backwards: Breeding season is December through October for a ten month period. I am unaware I provided any specific data, knowingly, for this project, to ZPAC or its consultants.
3. Section 3.8.2 page 3-24. Any increases of rats, mongooses and feral cats their predators, in the area so near to Hawaiian Goose release is of considerable concern to the State. This EA suggests the windfarms could generate population increases of such mammals. This needs mitigation.
4. Section 3.8.2 page 3-25 and 3-27 Discussion and Shearwater and Petrels: It should be imperative that the turbines by ZPAC have red flashing-lights affixed to them and operable all night long to deter collisions by nocturnally active petrels, shearwaters, and Hawaiian Geese.

ZPAC personnel or consultants need to survey at bi-weekly intervals for 12 weeks, then monthly for an additional 12 weeks, beginning with initiation of turbine activity and report results to the Division of Forestry and Wildlife. All injured wildlife or carcasses of wildlife need to be salvaged and given to DOFAW due to the fact that Hawaiian Bat, Hawaiian Goose, and/or Dark-Rumped Petrels could be involved. As an additional control, entry permission for State Wildlife Staff to do spot visits to the turbines need to be developed.

Comments

1. The Maui Division of Forestry & Wildlife has long considered establishing a public game bird hunting program over the State lands in the Ukumehame area. The project area has bountiful populations of both Ring-necked Pheasants and Black Francolin along with Gray Francolin and doves (2 species). As the total project area is said to utilize only some 8.7

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DOFAW

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acres, of the 200 acre parcel, the balance of the project parcel should be allowed for game bird hunting. Although other acreage remains for public hunting, the project area is one of the better parcels with an average of 8% downward slope, without numerous gullies and ravines. As no mention of public game bird hunting was noted in the EA, we trust this to be an oversight, which will be addressed and deemed "compatible" in the area.

2. The creation of an additional access road to the project area will foreseeably create a tremendous "unauthorized entry" problem. The existing access road, although posted, generates numerous complaints of unauthorized entry of hikers, mountain bikers, and dirt bikes. Where the existing access road and Na Ali Hale trail intersect, numerous hikers deviate from the hiking trail and proceed along the access road. No mention is made as to proposed deterrents along Honopūlani Hwy and at the Na Ali Hale trail intersection to curb unauthorized entry and passage along the proposed route.
3. Although the issue of "grass fires" is mentioned in the EA, a real threat exists of a wildfire being started as a direct result of the project; be it initiated by downed lines, vehicle catalytic converters or any other means. The recent Papawai Point Wildfire is an example of what can be expected should a wildfire start in the vicinity. The fact that mauka of the project site is the Nene release area further adds credence to this concern. In the event that a project related wildfire is started, the applicants should assume all costs for suppression and losses, and bear full responsibility thereof.
4. Although the need for "additional study" of bird strikes was mentioned and that nocturnal studies for Dark-rumped Petrels and Wedge tailed Shearwaters be conducted, more thorough dusk to dark studies for the presence of bats should be conducted along with nocturnal monitoring of the movements of the Nene. Any loss of an endangered species as result of a structure collision "after the fact" should not be tolerated.
5. Mention was made of maintenance equipment and supplies being stored either in the O&M structure or "designated graded parking areas" only, however no mention was noted of contaminant (i.e., petroleum products, acids, solvents, etc.) containment in the event of accidental release. Appropriate means for containment must be included in any plans and subject to review and approval by the authority having jurisdiction.

Comments

1. In 1995 nene propagation and releases occurred in the upper portion of Hana'ula. To date a total of 62 nene were released in this area. During the Down Wildlife Survey, which was conducted in 1997 there were only 23 nene. Concerns of wind generators could hamper and create downed nene and affect their flyways which occur from Hana'ula to Haleakala, Lahaina, and Wailea.
2. Nene are not agile fliers like sea birds and tend to fly in pairs or family flocks and prefer grassy habitats. Nene are also ground nesting birds. This proposed area for wind generators will hinder possible breeding, flocking, and nesting sites for the nene.

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3. Concerns for nearby nesting around wind generators may cause grounding, injury, or death to nene fledglings as well as adults.
4. In section 3.8 it is not noted that Hawaiian Hoary bat is listed as an endangered species. In section 3.8.2 it states that wind turbines should be clearly visible to birds and bats. It should be noted that bats travel on sonar rather than vision.
5. It is known that Dark-rumped petrels and Wedge-tailed shearwaters are residents of Maui, and potential strikes may occur especially when attracted to tower lights.
6. The Pacific golden plover is listed as a migratory species which inhabits mostly open areas with either low vegetation or large grassy fields very similar to the proposed wind generator site.
7. Forest Bird Recovery Plans recommends translocation of forest birds that once inhabited the West Maui Forest Reserve. This project could make a negative impact on this translocation of the reintroduction of forest birds to the West Maui Forest Reserve.
8. Inclement weather conditions already plays an important role in the movement of wildlife and should these wind generators they be erected may cause more grounded wildlife.
9. According to the survey that was conducted for Down Wildlife, some important factors were not considered; first, night monitoring and surveys conducted during the early mornings as well as sunset. This is an important factor to consider when addressing endangered species, such as Nene, Dark-rump petrel, and the Hawaiian bat. Second, it appears that what was done was a sweep through the wind monitoring towers instead of conducting a survey and monitoring wildlife.

Should this project be approved we recommend the following conditions should apply:

1. A fire plan be developed.
2. That all trash accumulated from the construction from the area be properly removed.
3. As stated in the Environmental Assessment, the life of this project (30 years) that conditions to restore the area will be strictly enforced.
4. That the access road leading form Honapiilani Highway at Mc Gregor to the project site be improved and maintained.
5. That Division of Forestry and Wildlife staff be permitted on the project site at anytime upon request.
6. That monitoring of wildlife be conducted during the construction.

EXHIBIT 6A


ZOND PACIFIC INC
A Subsidiary of ENRON Wind Corp.

January 4, 1998

Michael G. Buck, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
P O Box 821
Honolulu HI 96809

Subject: CDUA File #MA-2902, Zond Pacific, Inc. 20 MW Windfarm on Kaheawa Pastures,
Ukumehame ahupua'a, Maui TMK 4-8-01; Par. 1, approximately 200 acres

Dear Mr. Buck:

This letter is in response to your letter to Lauren Tanaka, Planner, Land Division, DLNR, dated August 12, 1998, same subject. This letter included detailed comments from your staff on the draft Environmental Assessment (EA) prepared by WSB-Hawaii for Zond Pacific's proposed (subject) 20 MW windfarm on Maui. I have included attached a response to each of the detailed comments. This response incorporates the results of meeting with DLNR staff on Maui on December 18, 1998.

The meeting participants included myself, Zond Pacific's consultants Warren Bollmeier (WSB-Hawaii) and Eric Nishibayashi (Eric Nishibayashi Consulting) and DLNR staff (Dr. Carol Terry, Meyer Ueoka, Dr. Fem Duval, John Medeiros, John Cummings and Mike Baker).

The meeting was very helpful in terms of gaining a better understanding of DLNR's comments on the EA and DLNR's plans for the Ukumehame District. We believe the interchange also helped DLNR gain a better understanding of Zond Pacific's plans. The discussion centered on the concerns regarding the safety and habitat of the avifauna (especially the Nene) that are either residents in or that may frequent the proposed project area. Zond Pacific recognizes the possibility that Nene may collide with the wind turbines. However, it is not known whether the project would have a significant impact on the local Nene population.

Because there may be a significant impact to the newly introduced Nene and your concern that the project is significant by size alone, we will be upgrading the final EA to an EIS. We will be following OEQC rules for the expansion of our application.

In addition, we collectively do not know what mitigative measures would prevent Nene collisions with the wind turbines and/or their towers. Therefore, we agree with DLNR staff that an additional survey needs to be conducted to confirm the presence of the Nene on the project site and to study their habits. Zond Pacific's goal is to use the results of the survey to devise an improved mitigative measures strategy to minimize the incremental risks of the project to the Nene. Zond Pacific will follow-up with DLNR staff (John Medeiros and Dr. Fem Duval) to plan and coordinate this study.

485 Waiale Rd.
Honolulu, Hawaii 96703
Ph: 808/244-9389 • FAX: 808/244-9538

13000 Jamieson Rd.
Tehachapi, California 93561
Ph: 805/922-5835 • FAX: 805/922-5015

309 Avalon Dr.
Ashland, Oregon 97520
Ph: 541/482-0854 • FAX: 541/488-2504

JAN-26-99 10:13 AM KEITH AVERY

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Michael G. Buck,
January 4, 1898
Page 2

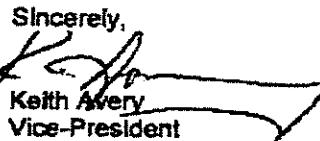
It was also agreed that surveys should also be conducted to identify the presence and habits of other important species, including the Dark-rumped Petrel, Wedge-tailed and Newell's Shearwater, and the Pueo. Zond Pacific will follow-up with DLNR staff to coordinate these surveys. Note: since we did not discuss the Hawaiian Hoary Bat, we will follow-up with DLNR staff to discuss the need for a bat survey, although none have been identified previously.

We also discussed the potential impacts of the project on the Na Ala Hele Trail and Access Program, and specifically the potential impact to the Old Lahaina Pali Trail. The potential impacts include the possibility that the project will become an attractive nuisance and that the presence of the wind turbines will negatively impact the viewplanes along the trail. From the discussion, Zond Pacific agrees that the windfarm may encourage hikers to stray from the trail for a closer look at the wind turbines. Note that we have withdrawn its proposal for a new access road to the site. Thus, hikers would have to hike cross-country and uphill to reach the windfarm site. While this is a possibility, Zond Pacific notes that uninvited visitors have not been a problem on any of its existing windfarms in California and other locations. Zond-Pacific will follow-up with DLNR staff to discuss potential mitigative measures.

Regarding potential visual impact, Zond Pacific believes that six to as many as seven or eight or parts of wind turbines will be visible along up to a half mile or so of the trail. The view of the wind turbines will be behind the existing new utility transmission lines. Evaluation of the potential visual impact is necessarily subjective and dependent on the viewer and his viewpoint. Zond Pacific continues to believe that the presence of the wind turbines will not be found to be visually intrusive to hikers. Zond Pacific will follow-up with DLNR staff to discuss potential mitigative measures to reduce the potential visual impacts.

Also please note that the original TMK reference (TMK 4-08-01: par. 8) for the subject CDUA was inadvertently reported incorrectly. The correct designation is as stated above: TMK 4-8-01: par. 1.

If you have any questions on our response to your comments, please call me at 800-805-1050.
Mahalo!

Sincerely,

Keith Avery
Vice-President

Attachment



ZOND PACIFIC INC.
A Subsidiary of ENRON Wind Corp.

Attachment

**Zond Pacific Responses to DLNR Comments re:
Zond Pacific's Draft Environmental Assessment
Kaheawa Pastures 20 MW Windfarm**

The following comments with Zond Pacific's responses were received from:

Na Ala Hele Trails and Access

Comments:

1. The report seems to relate overall close coordination on the placement and mitigation of impacts on behalf of the Trails & Access Program. The report also suggests the project has a seeming fit with the Program's Vision statement and responsibilities. It describes a future scenario where impacts would be felt chiefly by maintenance and DLNR personnel. Finally, it suggests that consultation with State agencies has and will go far toward developing mitigative measures across a wide spectrum of impacts. We disagree.

ZPAC Response. ZPAC did discuss the proposed wind project with DLNR (Mike Baker) during the application period for the Wind Monitoring equipment. ZPAC agrees that coordination could have been better during the preparation of windfarm EA and apologizes for this oversight. ZPAC has met on December 18, 1998 with Mike Baker to discuss the issues of concern to the Trails & Access Program. There is need for additional discussion. ZPAC will take the action to follow-up.

2. A representative of Zond Pacific contacted Na Ala Hele several years ago to discuss setting up test equipment for wind force and duration sampling. However, there has been no other consultation or direct communication about the subject project with NAH District Staff. Claims of recent telephone consultation between Staff and applicant representative are apparently false. No field inspections or other specific consultation related to placement of the proposed turbine structures has yet been made.

ZPAC Response. As noted above, ZPAC agrees that coordination could have been better during the preparation of windfarm EA and apologizes for this oversight. ZPAC's consultant WSB-Hawaii did contact the following DLNR (Mark Peyton, Kirk Cottrell and Erin Low personnel on January 14, 1998 regarding the proposed project). We apologize for not following-up prior to the release of the draft EA with Mr. Baker. As noted above, additional discussion and follow-up will occur.

3. Important to the Lahaina Pali Trail's historic and interpretative context is its relative remoteness from developed areas. With the exception of damage to the trail resulting from constructing an access road during installation of the MECO 69KV Power Line project, and negative impacts to views caused by the power poles and lines themselves, the areas around the Trail remains relatively free of infrastructure intrusive to view planes. Construction of the proposed turbines would amount to a direct assault on those view planes from points along the trail.

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ZPAC Response. Zond Pacific believes that six to as many as seven or eight wind turbines (or parts of wind turbines), will be visible along up to a half mile or so of the trail. The view of the wind turbines will include the existing utility transmission lines. Evaluation of the potential visual impact is necessarily subjective and dependent on the viewer and his viewpoint. Zond Pacific continues to believe that the presence of the wind turbines will not be found to be visually intrusive to hikers. Zond Pacific will follow-up with DLNR staff to discuss potential mitigative measures to reduce the potential visual impacts.

4. Numerous incidents of trespass and unauthorized access by four wheel-drive passenger cars, motorcycles, mountain bikes, and hikers are noted by our Department regularly. We believe the project will create an attractive nuisance in the sense that trespassers may be emboldened to approach the turbines and vandalize them. With our Department's diminished capacity to enforce no-trespass laws in the area, the project would likely become a magnet for periodic acts of vandalism.

ZPAC Response. ZPAC agrees that some hikers may choose to divert from the trail up the existing access road or go cross-country to seek a better view of the wind turbines. Realistically, there is no way to prevent this type of occurrence. However, ZPAC notes that there is relatively little evidence from other windfarms to suggest that vandalism will be a significant problem. Wind turbine towers are designed and installed to be unclimbable except by maintenance personnel. The fact that ZPAC personnel will be on-site (though not daily) will be a deterrent. Zond-Pacific will follow-up with DLNR staff to discuss any additional potential mitigative measures.

5. As mentioned above, the Draft EA seems to suggest an overall acceptance on Na Ala Hele's part based on close consultation and a seeming fit with the Program's vision and responsibilities. In fact, the opposite is true. Our definition of "sound conservation principles" includes preservation of view planes and cultural heritage that is inconsistent with any large-scale, audibly moving turbine structures.

ZPAC Response. Following discussions on Dec. 18, we understand this concern. As noted before, evaluation of visual impact is necessarily subjective. Consequently, we would agree that reasonable people can disagree as to what is a visual intrusion. ZPAC does not believe that hikers will find the wind turbines to be visually intrusive. In fact, the opposite may be proven to be true. Note: the Pacific Crest Hiking Trail comes within 100' of 700 kW wind turbines in Tehachapi, CA. The local Chapter of the Sierra Club, which supports the windfarms in Tehachapi, provides periodic guided hikes along this section of the trail. ZPAC will continue to follow-up with DLNR personnel to discuss potential mitigative measures.

Wildlife

Comments:

1. Section 3.8.1 page 3-20. Footnote 3 denotes consultation by ZPAC with myself about birds, bird's habitats, and habits in reference to this project - This is false.

ZPAC Response. The person providing this comment, as well as the following four comments, is not named, but is assumed to be Dr. Fern Duval. ZPAC's consultant WSB Hawaii (Warren Bollmeier) did contact Dr. Duval on February 12, 1998 and again on February 26, 1998.

2. Section 3.8.2 page 3-23. A quote attributed to myself. "The breeding season is in the fall from October through December" is exactly backwards: Breeding season is December through October for a ten month period. I am unaware I provided any specific data, knowingly, for this project, to ZPAC or its consultants.

ZPAC Response. ZPAC apologizes. This was a typo and will be corrected in the final EA. As mentioned above, Warren Bollmeier did contact Dr. Fern Duval.

Section 3.8.2 page 3-24. Any increases of rats, mongooses and feral cats their predators, in the area so near to Hawaiian Goose release is of considerable concern to the State. This EA suggests the windfarms could generate population increases of such mammals. This needs mitigation.

ZPAC Response. ZPAC agrees with the concern regarding the Nene. However, ZPAC does not believe the windfarm design as proposed will encourage significant increases in rodent populations. Where there have been increases of rodent populations on mainland windfarms, several factors were present including: (1) a higher density of turbines leading to a greater disturbance of the land. ZPAC will minimize actual permanent disturbance of the land as discussed in the EA; (2) areas of disturbed land that were either not necessary (e.g., unnecessary on-site roads) or were not revegetated where possible (e.g., areas disturbed around tower foundations), and (3) lack of attention to good housekeeping habits (e.g., rubbish, including construction materials and broken wind turbine parts, was not removed on a regular basis).

Mitigation measures will be implemented during construction and operation of the proposed windfarm project to: (1) prevent transport of rodents to the site, (2) minimize disturbance of the land, (3) construct and maintain rodent-proof site structures, (4) remove rubbish expeditiously during construction and routinely during operation, and (5) trap rodents should that prove to be necessary.

3. Section 3.8.2 page 3-25 and 3-27. Discussion and Shearwater and Petrels: It should be imperative that the turbines by ZPAC have red flashing-lights affixed to them and operable all night long to deter collisions by nocturnally active petrels, shearwaters, and Hawaiian Geese.

ZPAC Response. ZPAC's concern is to maintain a balance between making the wind turbines sufficiently visible to the birds, while not impacting human perceptions. For example, bright lights may attract birds to the towers. Bright flashing lights will certainly bring unnecessary human attention to the towers. ZPAC believes there is viable solution that must take into account: (1) any FAA requirements (yet to be determined), (2) relevant

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research data pertaining to alerting vs. attracting birds with lights, and (3) visual impact to humans. ZPAC will revise the EA after reaching consensus with FAA, DLNR and other parties as to the best approach.

ZPAC personnel or consultants need to survey at bi-weekly intervals for 12 weeks, then monthly for an additional 12 weeks, beginning with initiation of turbine activity and report results to the Division of Forestry and Wildlife. All injured wildlife or carcasses of wildlife need to be salvaged and given to DOFAW due to the fact that Hawaiian Bat, Hawaiian Goose, and/or Dark-Rumped Petrels could be involved. As an additional control, entry permission for State Wildlife Staff to do spot visits to the turbines need (sic) to be developed.

ZPAC Response. ZPAC's agrees. Wildlife monitoring should be conducted during the construction and initial operation phases. ZPAC will discuss the elements for a monitoring program and also a wildlife grounding protocol. The monitoring program and wildlife grounding protocol will be included in the final EA.

Comments

1. The Maui Division of Forestry & Wildlife has long considered establishing a public game bird hunting program over the State lands in the Ukuimehame area. The project area has huntably populations of both Ring-necked Pheasants and Black Francolin along with Gray Francolin and doves (2 species). As the total project area is said to utilize only some 8.7 acres, of the 200 acre parcel, the balance of the project parcel should be allowed for game bird hunting. Although the acreage remains for public hunting, the project area is one of the better parcels with an average of 8% downward slope, without numerous gullies and ravines. As no mention of public game bird hunting was noted in the EA, we trust this to be an oversight, which will be addressed and deemed "compatible" in the area.

ZPAC Response. ZPAC was unaware that DLNR had potential plans to allow bird hunting in the project area. Not including this potential use in the EA was an oversight. This potential use will be discussed in the final EA. ZPAC believes that the windfarm will be a compatible with bird hunting.

2. The creation of an additional access road to the project area will foreseeably create a tremendous "unauthorized entry" problem. The existing access road, although posted, generates numerous complaints of unauthorized entry of hikers, mountain bikers, and dirt bikes. Where the existing access road and Na Ala Hele trail intersect, numerous hikers deviate from the hiking trail and proceed along the access road. No mention is made as to proposed deterrents along Honoapiliiani Hwy and at the Na Ala Hele trail intersection to curb unauthorized entry and passage along the proposed route.

ZPAC Response. After further review, ZPAC has decided to withdraw its proposal for construction of a new site access road and will utilize the existing road for site access. However, since there is concern regarding traverse of the upper, more sensitive areas of the Kaheawa Pastures, ZPAC is investigating the possibility of utilizing an existing secondary

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spur that traverses an upper section of the Manawainui Gulch at approximately 2,800 ft. elevation. This would avoid use of approximately two miles of the upper roads. ZPAC commissioned an inspection of the proposed route by its avian, plant and archaeological consultants. ZPAC will revise the draft EA to incorporate these changes and to include new mitigation measures as appropriate to protect the flora and fauna and any cultural resources found along this route.

3. Although the issue of "grass fires" is mentioned in the EA, a real threat exists of a wildfire being started as a direct result of the project; be it initiated by downed lines, vehicle catalytic converters or any other means. The recent Papawai Point Wildfire is an example of what can be expected should a wildfire start in the vicinity. The fact that mauka of the project site is the Nene release area further adds credence to this concern. In the event threat a project related wildfire is started, the applicant should assume all costs for suppression and losses, and bear full responsibility thereof.

ZPAC Response. ZPAC has taken steps in the design of the proposed project to minimize the risk of a windfarm-generated fire. These include: (1) undergrounding of the intra-site electrical collection network, (2) design of the site substation to industry standards, which include a fire-clear zone within the fenced-in substation area, and (3) automatic shutdown features in the wind turbines in the case of overheating of the key components. ZPAC agrees with comment regarding operational fire-prevention measures, e.g., ensuring that all vehicles have spark arrestors, cellular phones, and fire extinguishers. The EA will be revised to include site operation fire-prevention measures. ZPAC carries fire insurance on all of its projects.

4. Although the need for "additional study" of bird strikes was mentioned and that nocturnal studies for Dark-rumped Petrels and Wedge tailed Shearwaters be conducted, more thorough dusk to dark studies for the presence of bats should be conducted along with nocturnal monitoring of the Nene. Any loss of an endangered species as result of a structure collision "after the fact" should not be tolerated.

ZPAC Response. ZPAC concurs that an additional bird survey should be conducted (prior to project approval) to: (1) identify the presence and study the movements of species that are known to be on Maui, but were not identified to be on site during the previous survey, and (2) revise the planned mitigation measures as appropriate.. ZPAC will coordinate with DLNR in the design, implementation and review of the results of an additional survey (s).

5. Mention was made of maintenance equipment and supplies being stored either in the O&M structure or "designated graded parking area" only, however no mention was noted of contaminant (i.e., petroleum products, acids, solvents, etc.) containment in the event of accidental release. Appropriate means for containment must be included in any plans and subject to review and approval by the authority have jurisdiction.

ZPAC Response. ZPAC concurs with this comment. This was an area that was overlooked in the EA. The EA will be revised to include the following operational and protocol procedures: (1) listing of maintenance equipment and supplies that will be on-site, (2) procedures for storing and containing potential contaminants, and (3) procedures for disposing of spent materials, e.g., gearbox oil, hydraulic fluid, etc.

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Comments

1. In 1995 nene propagation and releases occurred in the upper portion of Hana'ula. To date a total of 62 nene were released in this area. During the Down Wildlife Survey, which was conducted in 1997 there were only 23 nene. Concerns of wind generators could hamper and create downed nene and affect their flyways which occur from Hana'ula to Haleakala, Lahaina, and Wailuku.

ZPAC Response. ZPAC plans to conduct an additional bird survey. Hopefully, this survey will provide the answers to some currently unanswered questions about the Nene. Are they frequenting the project area? Are there any discernible flight patterns that could be disrupted by the wind turbines. Will the turbines disrupt their habitat? ZPAC will coordinate with DLNR in the design, implementation and review of the results of this survey.

2. Nene are not agile fliers like seabirds and tend to fly in pairs or family flocks and prefer grassy habitats. Nene are also ground nesting birds. This proposed area for wind generators will hinder possible breeding, flocking, and nesting sites for the nene.

ZPAC Response. The previous bird study did not result in any sightings of Nene in the project area. As noted above, the additional survey should shed some light on the Nene's frequency and use of this area. ZPAC will coordinate with DLNR in the design, implementation and review of the results of this survey.

3. Concerns for nearby nesting around wind generators may cause grounding, injury, or death to nene fledglings as well as adults.

ZPAC Response. The same comments apply as for 2. above.

4. In section 3.8 it is noted that (sic) Hawaiian Hoary bat is listed as an endangered species. In section 3.8.2 it states that wind turbines should be clearly visible to birds and bats. It should be noted that bats travel on sonar rather than vision.

ZPAC Response. The comment is well-taken and the EA will be revised accordingly. ZPAC's understanding is that bats are attracted to lights, as are insects. ZPAC will consult with a bat expert to add a more detail to the discussion of bats in the EA.

5. It is known that Dark-rumped petrels and Wedge-tailed shearwaters are residents of Maui, and potential strikes may occur especially when attracted to tower lights.

ZPAC Response. This issue needs further discussion, as we have received conflicting inputs. Will lights alert or attract the birds? If lights are needed, is a red-flashing light preferred? ZPAC will consult with additional bird experts knowledgeable in the use of lighting to alert birds and bats.

6. The Pacific golden plover is listed as a migratory species which inhabits mostly open areas with either low vegetation or large grassy fields very similar to the proposed wind generator site.

ZPAC Response. There have been recent sightings of the Pacific golden plover in the area since the recent fire.

7. Forest Bird Recovery Plans recommends translocation of forest birds that once inhabited the West Maui Forest Reserve. This project could make a negative impact on this translocation of the reintroduction of forest birds to the West Maui Forest Reserve.

ZPAC Response. This issue was not discussed during the December 18, 1998 meeting. ZPAC would like to discuss these potential plans and will follow-up with DLNR staff.

8. Inclement weather conditions already plays (sic) an important role in the movement of wildlife and should these wind generators they (sic) be erected (sic) may cause more grounded wildlife.

ZPAC Response. This issue was not discussed during the December 18, 1998 meeting. ZPAC would like to discuss these potential plans and will follow-up with DLNR staff.

9. According to the survey that was conducted for Down (sic) Wildlife, some important factors were not considered; first, night monitoring and surveys conducted during the early mornings as well as sunset. This is an important factor to consider when addressing endangered species, such as Nene, Dark-rumped petrel, and the Hawaiian bat. Second, it appears that what was done was sweep through the wind monitoring towers instead of conducting a survey and monitoring wildlife.

ZPAC Response. As noted previously, ZPAC plans to conduct an additional bird survey. ZPAC will coordinate with DLNR in the design, implementation and review of the results of this survey.

Should this project be approved we recommend the following conditions should apply:

1. A fire plan be developed.

ZPAC Response. ZPAC agrees. A fire plan will be included in the final EA.

2. That all trash accumulated from the construction from the area be properly removed.

ZPAC Response. ZPAC agrees. This recommendation (already consistent with ZPAC's operational procedures) will be included in the EA as a mitigative measure to discourage rodent population growth.

3. As stated in the Environmental Assessment the life of this project (30 years) that conditions to restore the area will be strictly enforced.

ZPAC Response. ZPAC agrees. It is anticipated that this requirement would be included in the Conservation District Use Permit, Right of Entry, or the Term Easement Agreement.

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4. That the access road leading form (sic) Honapilani Highway at McGregor to the project site be improved and maintained.

ZPAC Response. ZPAC agrees. It is anticipated that this requirement would be included in the Conservation District Use Permit.

5. That Division of Forestry and Wildlife staff be permitted on the project site at anytime upon request.

ZPAC Response. ZPAC agrees and encourages the Division of Forestry and Wildlife to project site. It is anticipated that this requirement would be included in the Conservation District Use Permit.

6. That monitoring of wildlife be conducted during the construction.

ZPAC Response. ZPAC agrees. A plan for this monitoring program will be included in the final EA and would be included as a requirement in the Conservation District Use Permit.